pit and quarry

THE BASIC MAGAZINE IN A BASIC INDUSTRY

may 1960

Annual Lime and Agstone Issue

Drillmaster Does Double-Duty at Anaconda's RAINBOW VEIN

This one heavy-duty rig is used for both rotary and percussion drilling in varying rock formations

To drill blast holes through radically changing rock formations at the Anaconda Company's Rainbow Vein open pit zinc mine in Butte, Montana, the F & S Contracting Co. has had to use both rotary and percussion drilling. And *both* jobs are being done to excellent advantage with the versatile I-R Drillmaster shown above. For much of the overburden, roller-cone rotary bits are used. And in the harder layers overlaying the deep, narrow Rainbow Vein, which contains zinc and lead sulphides with values of gold and silver, the rotary bits are replaced with an I-R Downhole Drill for percussion drilling, using the same rotary head for drill rotation. Holes are drilled 42 ft deep with 6¼" bits on 15 to 18 ft spacing and loaded with fertilizer grade ammonium nitrate with diesel oil.

If you want top drilling speed and efficiency in *any kind of ground*, check the cost-saving advantages of the versatile I-R Drillmaster. Ask your I-R representative for complete details.

Ingersoll-Rand
72A5 11 Broadway, New York 4, N.Y.

A CONSTANT STANDARD OF QUALITY IN EVERYTHING YOU NEED FOR DRILLING ROCK

XTRA-TOUGH TREAD

New Hard Rock Lug Xtra Tred takes it when the going's toughest!

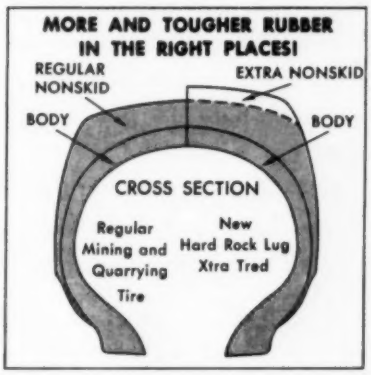
Here's the all-time stand-out tire for mine and quarry work. And Goodyear technology made it possible.

For instance, the thicker nonskid tread (up to 70% thicker than conventional tires) gives you hard-gripping getaways. Then, too, this rubber – specially compounded with super-toughening agents–shrugs off cutting, chipping and puncturing objects to give you the xtra-tough tread you need for rock work.

And, because it's made with 3-T Processed Nylon Cord – triple-tempered by Tension, Temperature and Time–the Hard Rock Lug Xtra Tred offers far greater resistance to bruises and breaks.

Summed up – this super-tough tire helps you take out pay loads *fast* – and at *low cost*. And it pays you the added dividends of less upkeep and more recaps.

Why not ask your Goodyear dealer for the full story today? Or, write: Goodyear, Truck Tire Department, Akron 16, Ohio. Remember, *lots* of good things come from Goodyear.



The World's Toughest Truck Tires by

GOODYEAR

Xtra Tred – T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

MORE TONS ARE HAULED ON GOODYEAR TRUCK TIRES THAN ON ANY OTHER KIND

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Armco Liner Plates Make Rugged Aggregate Bin

New steels are born at Armco

Armco Liner Plates were used in constructing this aggregate bin for the Falls City Stone Company of Fern Creek, Kentucky. The bin, serving as storage between primary and secondary crushing plants during breakdown, is 30 feet high, 360 feet in diameter and is built of 3-gage circular plates.

Lightweight and easy to erect, Armco Liner Plates are made in material thicknesses from 14 through 3 gage. This wide range means you buy no more steel than is needed to carry a particular load.

Roof over the bin, 24 feet wide and 34 feet long, is made of interlocking Armco STEELOX® panels.

For complete information, write to Armco Drainage & Metal Products, Inc., 6450 Curtis Street, Middletown, Ohio.

Steel

ARMCO DRAINAGE & METAL PRODUCTS

Subsidiary of ARMCO STEEL CORPORATION

OTHER SUBSIDIARIES AND DIVISIONS: Armco Division • Sheffield Division • The National Supply Company • The Armco International Corporation • Union Wire Rope Corporation

PIT and QUARRY

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To subscribers: When requesting change of address, kindly send old as well as new address.

PIT AND QUARRY IS INDEXED IN THE ENGINEERING INDEX

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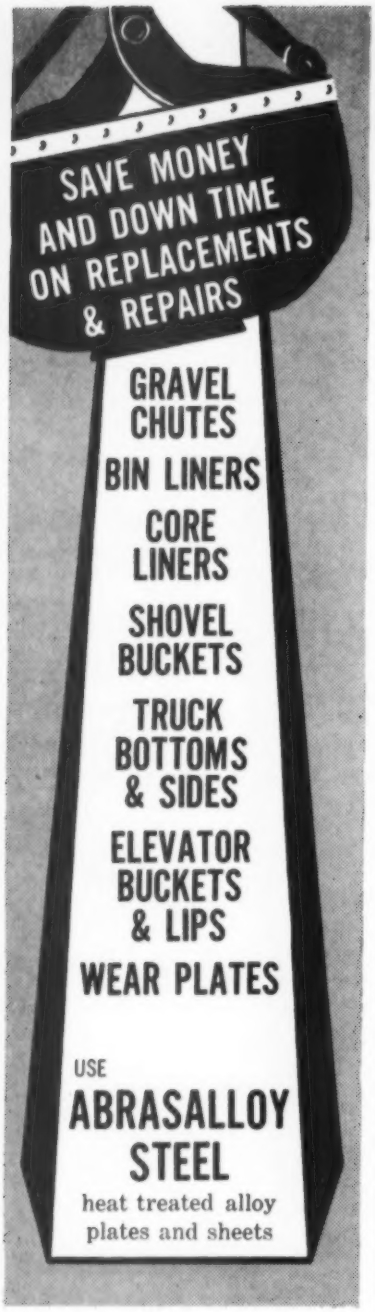

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For 33 YEARS —Always Ready to go!

WHEN does a Northwest wear out? We ourselves sometimes wonder! Here is a 33-year old veteran working for the Rion Crushed Stone Corporation at Rion, South Carolina. Take a good look at what it's handling—good hard, tough rock! Beaten up by the years, perhaps working on borrowed time, it is still always ready to go—and it's not through yet. This old rig is one of some fifteen Northwests that Rion has owned. The other picture shows their new 80-D in the pit.

Ability to serve, ability to stay on the job, ability to get the job done is behind repeat order purchases by people like Rion.

We built 'em tough in those days but they are tougher today. Northwests load fast and move fast! Plenty of power combines with the Northwest Dual Independent Crowd that utilizes force most independent crowd shovels waste to cut through a bank or handle heavy digging without "stuttering". Uniform Pressure Swing Clutches take the jerks and grabs out of swinging and make spotting accurate without losing time jockeying a load over the truck. The Cushion Clutch eliminates shock overloads before they reach machinery and the Feather-Touch Clutch Control gives the "feel" of the load and makes operation easy.

This is only part of the story. We would like to have you know the complete details on the size machine you need. Why not ask for a catalog?

NORTHWEST ENGINEERING COMPANY

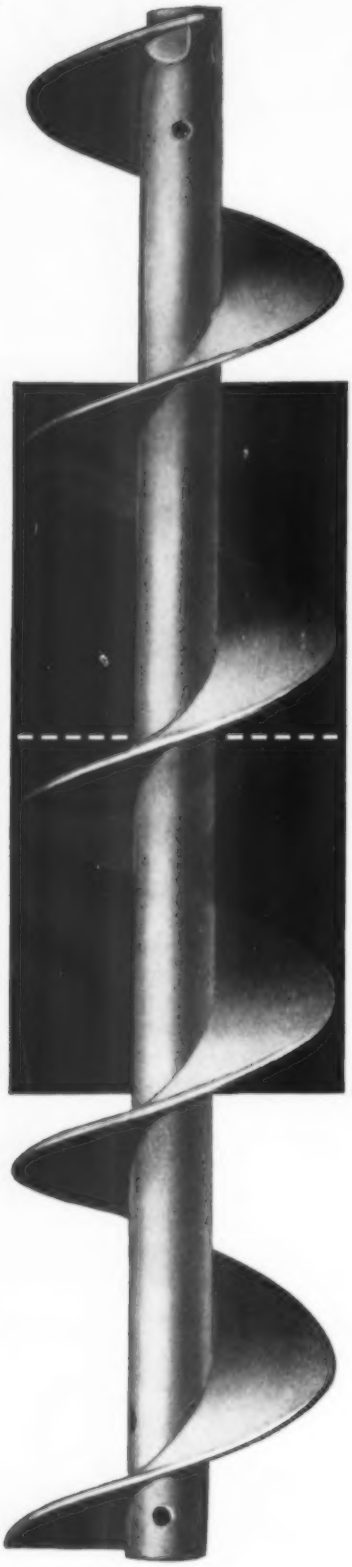
1515 Field Bldg. • 135 South LaSalle Street • Chicago 3, Illinois

S-80-105-S

NORTHWEST *Always Ready to* **GO**

NORTHWEST EQUIPMENT IS BUILT IN THE FOLLOWING SIZES

SHOVELS	CRANES	DRAGLINES	PULLSHOVELS	TRUCK CRANES
¾ Yd. to 2½ Yd. Capacity	13-Ton to 60-Ton Capacity	¾ Yd. to 3 Yd. Capacity	¾ Yd. to 2½ Yd. Capacity	25-Ton and 35-Ton Capacity



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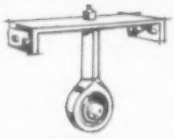
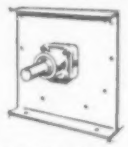
YOUR ONE SOURCE FOR ALL SCREW CONVEYOR NEEDS

your only source for many

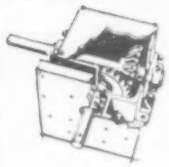
QUIK-LINK CONVEYOR SCREW. For ease in removal of conveyor section without disturbing other components. Can be furnished on Helicoid and Sectional flight conveyors.



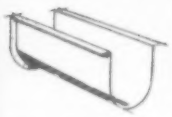
HANGERS have wide top bar with slotted bolt holes for easy assembly and alignment. Available with self-aligning ball bearing or with sleeve bearing in babbitt, hard iron, bronze or oil impregnated wood.



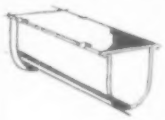
TROUGH ENDS of heavy steel plate are flanged at top and bottom. Furnished with babbitted, bronze or single or double ball bearing flange block, with or without trough end seal. Blocks are interchangeable.



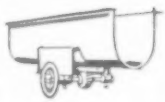
COUNTERSHAFT ENDS with ball and roller bearings or babbitted bearings, for right angle drive applications — common drive for two conveyors at right angles.



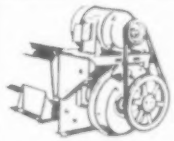
TROUGHS are accurately formed and jig-assembled. Steel angles securely welded to trough plate form top flanges. Can be made of stainless steel or other special metals to suit specific requirements.



SEMI-FLANGED, SPRING CLAMP COVERS are more rigid, easier to handle and form a tighter seal than plain type cover. Spring clamps are attached to cover—simplifies installation.



DISCHARGE SPOUTS AND GATES can be located anywhere along length of conveyor trough. Gates can be flat or curved —hand or rack-and-pinion operated.



DRIVES. Link-Belt shaft-mounted speed reducers are simple, compact — can be mounted directly on trough end plate. Motogears and Gearmotors with roller chain drives can also be furnished.

With seventeen basic screw designs, and a full line of components, Link-Belt can furnish anything you need from a single component to a complete line of screw conveyor.

As the foremost producer in this field, Link-Belt offers a range of new product improvements for profitable operation. Quik-Link conveyor screws, hangers, trough ends with ball or sleeve bearings, jig-welded troughs with new semi-flanged spring clamp covers—these and many more are cutting power demands and maintenance costs.

If you have bulk materials to be handled, it will pay you to look into the Link-Belt screw conveyor line. All components are available from stock. Call or write your nearest Link-Belt office or authorized stock-carrying distributor for Book 2989.

LINK-BELT

SCREW CONVEYOR

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices and Stock Carrying Distributors in All Principal Cities. Export Office, New York 7; Australia, Marrickville (Sydney); Brazil, Sao Paulo; Canada, Scarboro (Toronto 13); South Africa, Springs. Representatives Throughout the World. 15,230

Washed sand and gravel . . . 250 tons per hour profitably produced by

Diamond Stationary Plant

Twin loading hoppers for direct or blend feeding of pit run materials

- Twin traploading hoppers, each with 24″ x 3′6″ plate feeders
- 3 Lattice-framed plant belt conveyors (30″ x 140′, 24″ x 94′, 18″ x 50′)
- 2 4′ x 12′, 3-deck screens, spray-bar equipped
- 1 28″ water scalping classifying tank with triple collecting flume
- 2 Screw washers 36″ x 25′
- 1 Screw washer 20″ x 22′
- 2 Wash boxes
- 1 3′ cone crusher
- 1 10″ x 24″ jaw crusher
- 6 Stockpiling conveyors (from 18″ x 55′ to 20″ x 80′)

Diamond Iron Works engineers have helped a new sand and gravel operator design a plant to profitably produce 250 tons of crushed and washed aggregate per hour.

The firm is Parmar Sand, Inc. of Transfer, Pa.

Their Diamond closed circuit plant takes a wide variation of sand and gravel, obtained from two different pits, and turns it into seven basic grades, including both concrete and mason sand.

Parmar's market is broadened further because the close control possible with their Diamond plant assures materials which meet specifications for both highway and commercial construction in two states.

Another advantage of the plant, in addition to being compact and electrically driven, with all wiring underground, is that it requires very little supervision. And it is designed so that future expansion will require minimum alteration to existing facilities.

In summary, this is another example of how Diamond provided a profit package of high capacity, smooth operation, and low cost. We'd welcome the chance to help you—regardless of the size plant you want. See your Diamond Distributor.

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DIVISION
GOODMAN MANUFACTURING COMPANY
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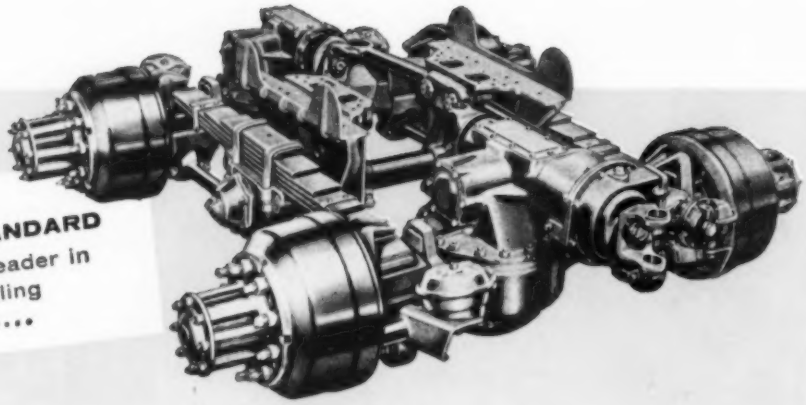

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Rugged Hauling
Operations...

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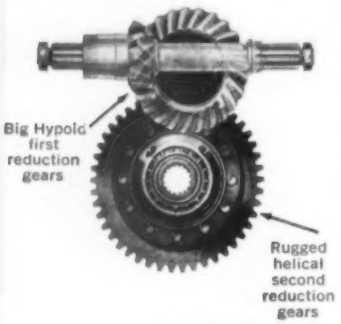
DOUBLE-REDUCTION TANDEMS LEAD IN TOP PERFORMANCE—LONG LIFE!

Timken-Detroit Heavy-Duty Tandems with Hypoid Helical Double-Reduction Gears are the big favorites for top performance and long life.
Here are some of the reasons why:

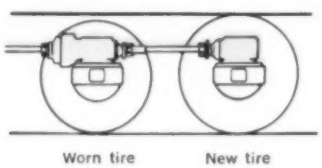
Rugged Hypoid-Helical Double-Reduction Gearing!

Balanced gearing – with two full-sized gear sets working in series to take an equal share of the load – provides a stronger power train with balanced gear set loadings and the widest range of ratios.



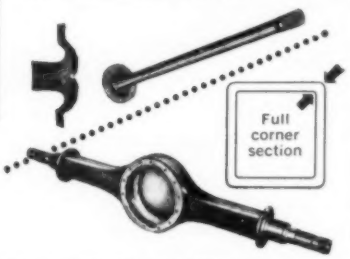
Driver Controlled Interaxle Differential!

Allows differential action between the axles to compensate for worn or mismatched tires. Both axles do equal amounts of work . . . can be disengaged at any speed, giving positive through drive when better traction is needed. *Straight-Line Through Drive* eliminates prop shaft angularity . . . increases bearing and gear life, reduces maintenance.



"Torsion-Flow" Axle Shafts and Hot-Forged Housings!

More splines, Torsion-Flow forging, and patented heat-treating processes make Rockwell-Standard shafts the toughest in the industry. Housings are hot-forged from high carbon steel, and are rectangular shaped with full strength corners for greatest strength with minimum weight.



Timken-Detroit Double-Reduction Tandems come in a wide range of capacities—6 models from 34,000 to 65,000 pounds.

Another Product of... **ROCKWELL-STANDARD CORPORATION**

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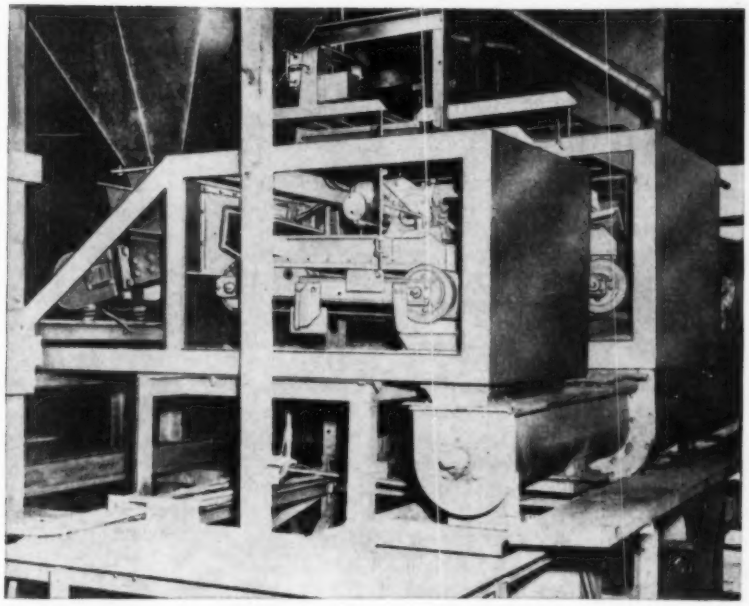
SYNTRON cost-reducing equipment of proven dependability

provide accurate, continuous flow feeding by weight



SYNTRON **Weigh-Flow**

GRAVIMETRIC FEEDERS

—are designed for the accurate, dependable weigh feeding of bulk materials. They offer extremely high accuracies, either electronic or impulse control, wide ranges capacities from a few pounds to 100 tons per hour. Industrial applications are almost unlimited—batch weighing, controlled feeding, blending, weight checking production line output, weighing in coming and outgoing bulk materials and many other weigh control of bulk materials uses.

Increase the control, capacity and efficiency of process feeding with SYNTRON Weigh-Flo Gravimetric Feeders.

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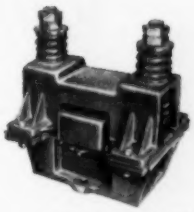
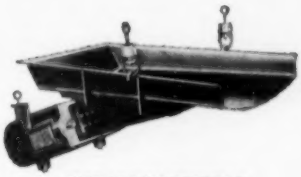
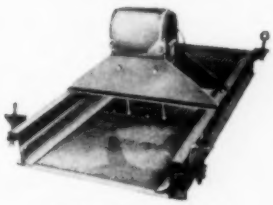
Other SYNTRON Equipment of proven dependable Quality



BIN VIBRATORS



VIBRATORY FEEDERS



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VIBRATORY PACKERS

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Millions of these new multiwalls have proved the advantage of this tougher, stronger paper. Plan a trial shipment of multiwalls, made of CLUPAK extensible paper, as part of your next bag order. Use the CLUPAK trademark when ordering and look for it on the bags. Only then can you be sure the bag paper meets the rigid strength specifications established by Clupak, Inc. for your benefit.

*Clupak, Inc's. trademark for extensible paper manufactured under its authority and satisfying its specifications. Clupak, Inc., 530 5th Ave., N. Y. 36, N. Y.

Washington News Letter

By S. HERBERT UNTERBERGER

THIS is the time of the year when Washington sees the results of two important surveys which have had a very good record of predicting economic events for at least the rest of the year. This year, these surveys are being studied with even greater than usual interest because of the well recognized relationship between economics and politics.

The Republicans, particularly, are highly gratified by the results, which show that, barring unforeseen developments, 1960 will be a year of rising economic activity. This means relatively little unemployment, which is generally regarded as a good sign for keeping the party in power in office for another term. The Republicans are basing a good deal of their optimism on the following.

Consumer Expectations

For many years the Federal Reserve board has paid for a survey of consumer expenditures made by the University of Michigan. The survey has proved to be a remarkably accurate predictor of future consumer expenditure behavior. As a result, this survey established a reputation which is virtually unchallenged. This year, the cost of the survey was borne by private interests, principally business concerns in cooperation with the Ford Foundation. Despite the change in sponsorship, the survey is still being made by the same people in the same way. Its results are equally objective.

This year's survey paints a picture of substantial optimism. Consumers have indicated that their buying intentions are away up. For example, they have reported that they expect to buy about 20 percent more automobiles than they did a year ago. A good deal of this increase will result from the fact that the automobile manufacturers this year are coming closer to providing the kind of product which consumers want. Much of the increase in automobile sales will be found in the compact car market if the survey is accurate.

The fact that consumers have indicated that they are returning to the housing market is perhaps of greater importance. This market has been in especially bad shape for more than a year. Home builders have been pessimistic about the situation because they noted a combination of two adverse circumstances. The first of these was that financing was becoming very much more difficult and expensive. But even if the financing problem could be solved, there appeared to be a dearth of eager buyers. The first good news is found in this survey, which shows a very rapid rise in the proportion of consumers who have expressed a firm intention of buying a home in 1960.

Not only does the survey show that consumers are anxious to buy, but also that there is increasing evidence of their having the wherewithal to fulfill their intentions. Thus, over 22 percent of the families surveyed this year reported incomes of more than $7,500. Less than 30 percent reported incomes as low as $3,000. From the standpoint of buying a house, an important figure is the volume of savings and other liquid assets which the buyer has. This year over 25 percent of the families reported liquid assets in excess of $2,000. Actually, 5 percent reported liquid assets of $10,000 or more. This is a larger proportion than in any previous year. An additional 6 percent reported assets of $5,000 or more.

As a final "frosting" on their report, the University of Michigan surveyors indicated that the proportion of people who think 1960 is a good time to buy is much higher than it was in 1959. It should be remembered that 1959 already shows a substantial improvement over the recession year 1958.

Capital Expenditures

Consumers, of course, are not the only people whose spending accounts for the level of economic activity. Although it is true that when consumer expenditures slow down, expenditures made by business for capital investments generally also fall and frequently fall more rapidly, the opposite is also frequently the situation—namely, that when consumer expenditures rise, capital expenditures rise at a more rapid rate. The latter apparently is likely to happen in 1960.

While the University of Michigan is making its survey of consumer expenditure expectations, two government agencies, the Department of Commerce and the Securities Exchange Commission, are making a co-operative survey of the plans of business men for making capital investments during the year.

The results of this survey are at least equally optimistic. Thus, they show that if capital expenditures are carried out according to the plans of business men, the volume of investments will be as high as it was in 1957 which, in turn, was the previous high point in history. This will be well above the recession year 1958 and also a good deal above the 1959 level. It should be pointed out that these results are based not on dollar sales alone, in which moderate price increases might have accounted for the increase in invest-

(*Continued on page* 44)

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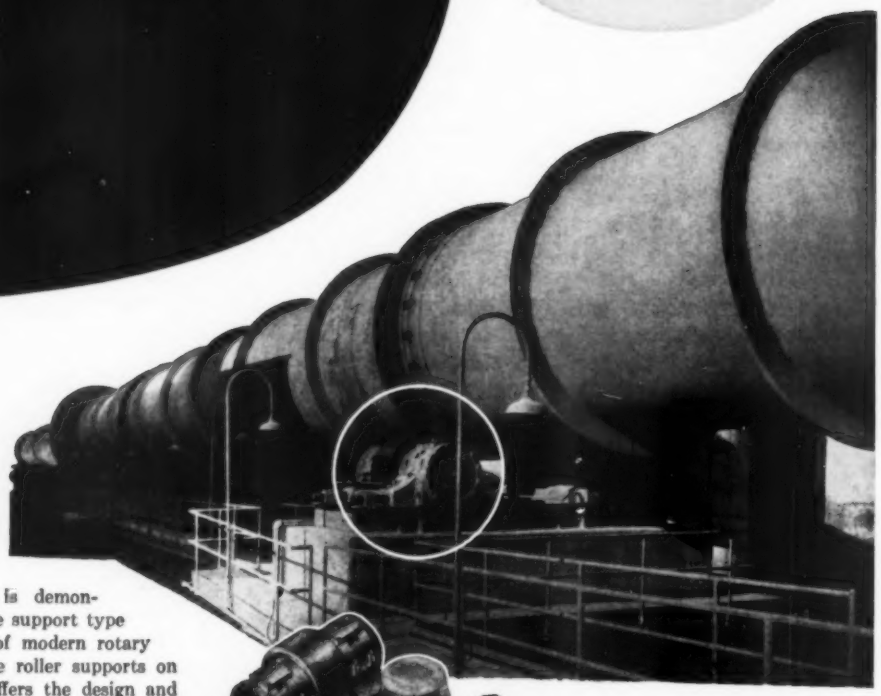

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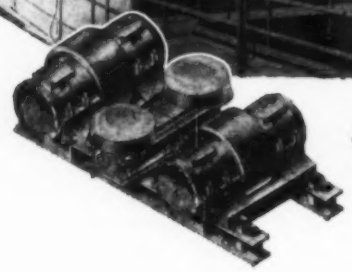

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Labor Developments

IN September, 1959, the Senate created its Special Committee on Unemployment Problems. This body, under the chairmanship of Senator Eugene J. McCarthy (D., Minn.), was composed of six Democrats and three Republicans. After holding a number of hearings in many cities and issuing several reports on the general problems of unemployment, the committee recently submitted its final report.

In conformity with the general pattern, this report was issued in two parts. The Democratic majority issued one report and the Republican minority issued its views separately. One might think that their positions were very far apart. However, careful analysis of what they have to say indicates that there were far more areas of agreement than of difference. In fact, the differences appear to be differences of emphasis rather than of position. This may be seen in the comment which the Republican minority made with respect to the major conclusions in the majority report.

The majority said, "Unemployment is a serious and continuing problem. Five percent or more of the labor force has been unemployed in 26 of the last 28 months. In some areas of chronic unemployment, the rate has exceeded 25 percent. Underemployment and 'hidden' unemployment statistics would increase the total."

This is what the minority had to say: "True, but this is not a valid or fair statement. There is no need to exaggerate unemployment. The majority deliberately picked a recession and early recovery period, when rates of unemployment are always high, to gauge unemployment. It would be

By S. HERBERT UNTERBERGER

S. Herbert Unterberger and Company
Economists-Consultants on Labor and Industrial Relations
Washington, D.C.-Philadelphia, Pa.

better to take a longer span of time, such as the post-war periods. A possible substitute for the second sentence would read as follows:

"In 5 of the 13 post-war years, 1947-59, the annual average unemployment rate was above 5 percent. In 8 of these years, it was below 5 percent.

"The same observation applies to periods of chronic unemployment. The rate of 25 percent is most exceptional. No major area of chronic unemployment has such a rate in the recent recession, although there may have been a few scattered smaller areas, such as the coal mining regions, where this is true. But 25 percent is so exaggerated as to be most unwise for use. The situation is bad enough without exaggeration, and the record can be criticized if it uses figures so easily challenged.

"We suggest instead the following:

"In some areas of chronic unemployment, the rate of unemployment has been double or more than double the national average. This was true during the recent recession. In a number of these areas it has exceeded 12 percent at various times in the post-war years."

To be sure, the statement of the Republican minority is somewhat more moderate. Its most revealing part, however, is its concession that "the situation is bad enough without exaggeration." It is here that the members of the committee are really in fundamental agreement. Both make very strong recommendations for action by the Federal Government, to deal with the unemployment problem.

Another conclusion of the majority reads as follows: "Unemployment is costly also in the loss of potential production. If 1,000,000 additional persons had been employed annually in the last decade, the gross national products would have been increased by an estimated $70 million. The need to make full use of our manpower resources becomes more urgent as a consequence of the economic challenge of the Soviet Union."

The minority comment is that "the first and last sentences are correct." They object to the middle sentence principally on the ground that the figures sound enormous. Here, again, there are differences of emphasis but not of fundamental positions. In another of its conclusions, the majority stated: "Unemployment is a national problem resulting from complex causes, most of them national in origin." The minority quarreled with this statement, insisting: "It is not true that most of these causes are national in origin. In chronic areas there are many local causes for unemployment." They would have preferred to say, "*many* are national, etc."

The other majority conclusion to which the minority takes exception is the following: "High rates of unemployment are not an indispensable part of the private enterprise system. Unemployment can be reduced by reasonable private policy, as demonstrated by the experience of Great Britain, Norway, Finland, the Netherlands, Switzerland, and France. The unemployment rates of these countries are considerably lower than those in the United States."

The minority agrees that the first sentence is correct, but they take violent exception with the next two senences, stating that they give a misleading and incorrect impression. They point out that in the European

(*Continued on page* 44)

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The biggest values you've *ever* seen in used equipment—nearly all makes, all sizes, all conditions—honestly described and rock-bottom priced. May is bargain month at your Caterpillar Dealer. He's taken in a lot of trades. He's offering the biggest bargains in his history. He'll deal—with financing tailored to your needs!

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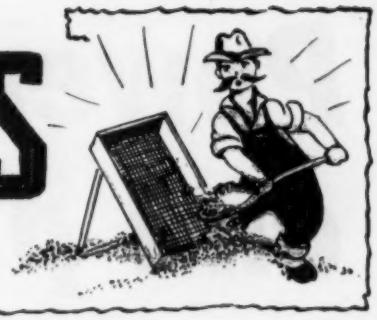
SCREENINGS



By RAY L. SMITH JR.

YESTERYEAR'S political bandwagons are today's memories. The din and tumult are gone, and in their place a strange vacuum of silence. This is one way, we suppose of saying that politics is yet to warm up this year.

Remember when Adlai Stevenson's trademark was a silver shoe with a hole in it . . . When Roosevelt predicted a new deal and music told us good times were here again . . . When Hoover said there'd be "a chicken in every pot, a car in every garage" . . . and the "Hoover Car" that followed an old hunk of auto drawn by a horse or cow . . . or "Keep cool with (Cal) Coolidge" . . . ?

This year the tunes may be these: "I'll stick with Dick" . . . "My cup of tea is Kennedy" . . . "The country needs Humphrey" . . . or "Stick with Symington."

We still like the story about a young lady reporter who was called before her editor for an error in an election story.

"Don't you know, young woman," he stormed, "that truth is to a newspaper what virtue is to a woman?"

"Yes," she replied, with a disarming smile, "but newspapers can print retractions."

Is Anybody Listening?

"STAMP MACHINE IS LICKED," says the headline on a press clipping we received concerning a talking stamp machine which has just been placed in solitary for embezzlement.

The machine was installed in 1956. When customers put in a coin and set the dials for the stamps they wanted, this ultimate expression of the post office's inhumanity to man automatically returned change and after clearing it's throat, thanked the customers in a clear clarion voice. Then the damned thing repeated such messages as:

". . . Introduce me to your friends. I like new customers."

". . . Send a letter to a loved one . . ."

"I'm another example of streamlined postal service."

But recently the post office workers were startled to find the machine was repeating itself, coughing too much, becoming too profuse in its thanks and overly eager to have people write letters home.

It talked to itself at night when there was not a customer in sight. Finally, the voice was turned off due to "inflammation of the tapes."

The machine apparently turned bitter. Last week there were many complaints that the machine was embezzling a penny on every purchase, shortchanging customers.

So the Post Office Department shut the machine off completely and stashed it away in a box. Harassed officials say the post office has written the factory for parts to put the mechanical clerk back in shape.

Potpourri and Succotash

It is rumored that a new simplified income tax form for next year contains just four lines:

1) What was your income last year?
2) What were your expenses?
3) How much have you left?
4) Send it in.

The grey-spatted suave North American diplomat was a great story teller. On a visit to Mid-Africa, he related a lengthy anecdote. His interpreter turned to the natives, said only four words, and everyone laughed heartily. "How," asked the diplomat, "could you tell the story so quickly?"

"Story too long," replied the interpreter, "so I say, 'He tell joke. Laugh.' "

"Lady, you got two very beautiful legs."
"How would you know?"
"I counted 'em."

A father sent his two sons into the hills on a cold night to herd sheep. Later he went out to see how they were getting along. He found one son dutifully watching the sheep and asked, "How are you?"

"Fine, father" replied the son, "but my lamp has gone out and I am cold." Whereupon the father gave the boy a new wick for his lamp. The father then came upon the second son who was fast asleep under a tree. He woke him and asked, "How are you?"

The boy replied, "I am cold, father, and need a new wick for my lamp." The father shook his head and said, "You shall not have it. There is no wick for the rested."

The following notice appeared on the bulletin board of a government office "Executives who have no secretary of their own may take advantage of the girls in the stenographic pool."

A transport plane was in trouble over the mountains. Four people had to jump overboard to lighten the load and save the plane. An Englishman said, "God save the Queen!" and jumped out. A frenchman shouted, "Vive la France!" and jumped. An Irishman said "Erin go Bragh!" and leaped out. A Texan grabbed a Mexican, hollered, "Remember the Alamo!" and threw him out.

"How do you suppose your wife will take it when you offer her five hundred thousand dollars for your freedom?"

"Probably in one thousand dollar bills.

Hotel guest (phoning at late hour): "Is this the desk clerk?"

Ill-humored clerk: "Yeah, what's eatin' you now?"

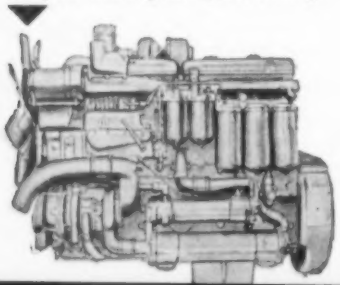
Guest: "That's what I'd like to know."

Power-steer and power-shift

with TD-25 standard equipment ...for full-load turns ...full-speed cycles!

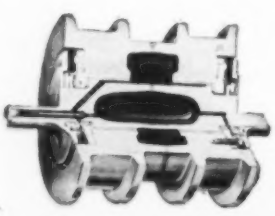
Keep big rock loads on the move *full time*, with exclusive Planet Power-steering. Full power on both tracks, full time is the answer! And Hi-Lo, on-the-go power-shifting lets you match power to condition, instantly, and keep the yard-boosting advantage of uninterrupted momentum!

Big power "plus" of the new TD-25 is the new direct-start, turbocharged 6-cylinder International DT-817 diesel engine. This versatile engine also powers International Payscraper®, Paywagon®, and rear-dump Payhauler® models — plus the TD-25. Equipment-spread power standardization simplifies your servicing and parts-stocking.



Cleaning the face of a Missouri strip mine behind a big dragline, this TD-25 shoves "tractor-sized" boulders aside with the greatest of ease. The "25" also builds dragline walkways and haul roads; pushes loaded trucks; and drastically cuts the cost of clearing new stripping areas.

Thickest-shelled roller design in the crawler industry—with king-size lube reservoirs and seal-protecting pressure-relief passages—let you power-lubricate without affecting seal life or efficiency. These are Dura-Rollers—the track rollers that make 1,000-hr lube intervals practical!



Enter 16 on card, page 233

No attachment! No after-thought! No stop-gap!

Years'-proven Planet Power-steering and Hi-Lo power-shifting are *designed-in, built-in,* basic standard equipment of the new 230-hp International TD-25.

With "live-track" Planet Power steering, you get full-load king-size crawler efficiency on turns, as well as straight-aways. And Hi-Lo power-shifting gives you on-the-go matching of power to load to give you big, cycle-speeding advantages!

International Planet Power-steering eliminates load-limiting "dead-track" drag. And Hi-Lo power-shifting does away with time-wasting "gear-shift lag." No wonder the new TD-25 can outearn king-sized clutch-steered crawlers up to 50%—on tough high-walling; overburden removal; and many other coal, mineral, or building-material mining jobs!

Big-capacity track-and-engine teamwork

New TD-25 7-roller tracks are strength-matched to team with the full effort of the New 230 hp diesel engine. The "25" is platformed on super-rugged double-box-beam frames—and carried smoothly on International's new minimum-maintenance Dura-Rollers!

Press the direct-start button, to command the "25's" free-breathing diesel horsepower. Dual valving of the "25's" high-torque DT-817 engine provides for peak turbocharging efficiency—to deliver full-rated performance from sea level to timberline!

Full TD-25 performance is at your fingertips, full time!

Power-shift and power-steer the new "25" with king-sized loads—around curves, upgrade, anywhere. Compare years-proven simplified International planetary design that's engineered and located to break the load-limiting, time-losing steering and shifting bottlenecks which plague king-sized clutch-steered crawlers. Measure all the "25's" standard equipment extra value features. Let your International Construction Equipment Distributor demonstrate!

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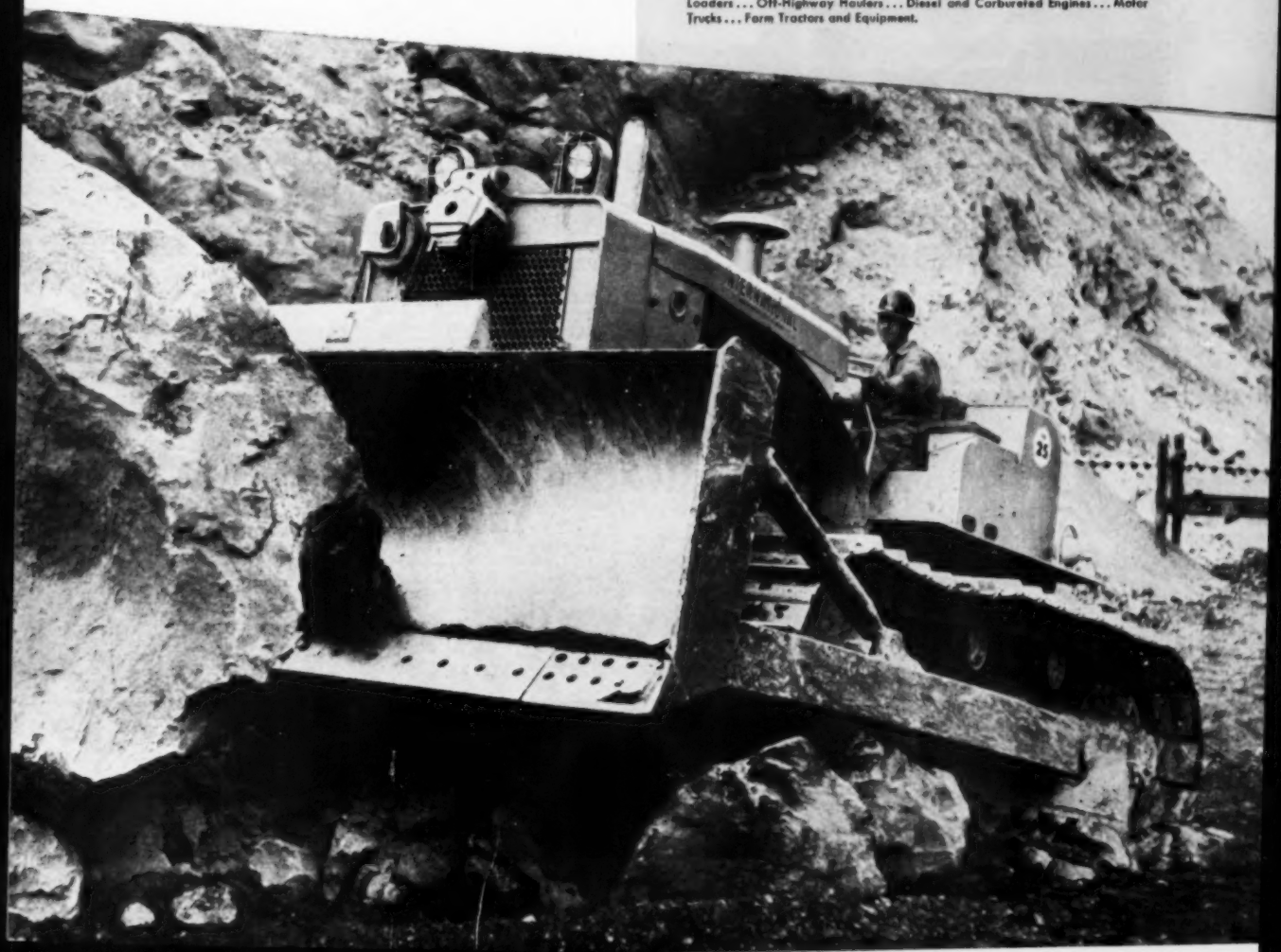
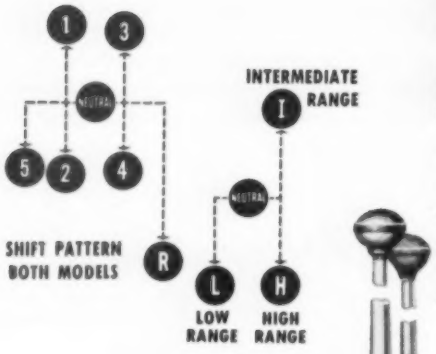


NEW Fuller Heavy-Duty

10 closely-spaced gear splits plus deep reduction ratios



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MODEL 15-H-1120

Fuller now offers two new 15-speed transmissions engineered for on and off-highway diesel truck operations demanding high capacity, long wear life and ease of operation . . . for logging, mining, construction, oil-field work, aggregates and ready-mix.

Advantages of the new transmissions include:

1. Extremely short installation dimension, which permits shorter wheelbase for tractors which formerly incorporated main and auxiliary transmissions.

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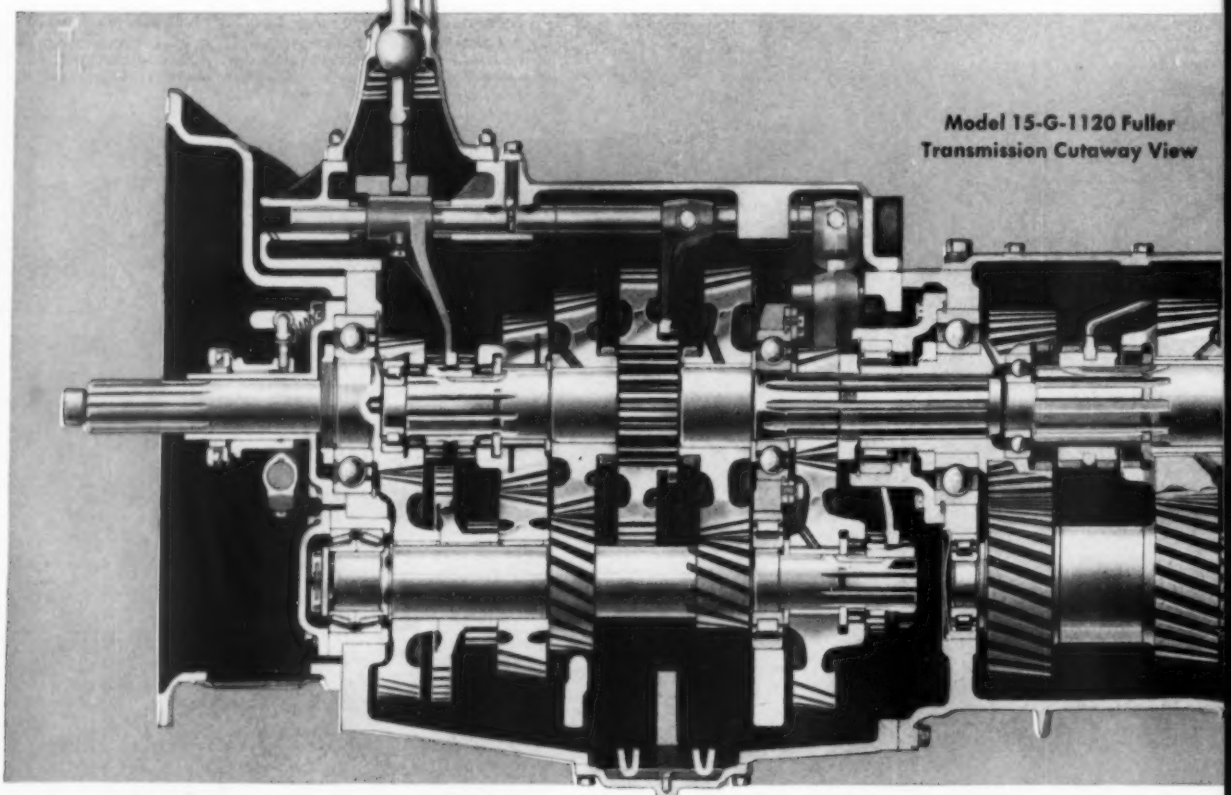

Model 15-G-1120 Fuller Transmission Cutaway View

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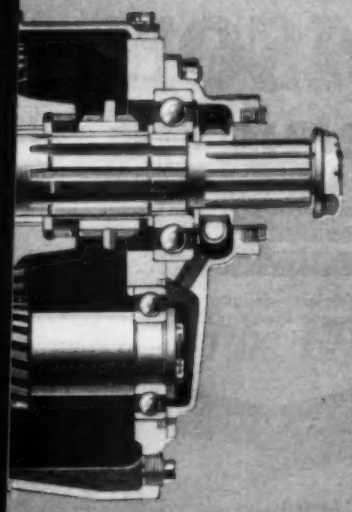
designed for combination on and off-highway applications

able for low range operation through a deep reduction in the auxiliary.

3. A wide choice of optional gear ratios to match every job requirement.

4. Weight reduction obtained by eliminating support brackets, joints, cross members and a propeller shaft.

For full details on the Fuller 15-G-1120 and 15-H-1120 Transmissions, ask your dealer or write Fuller Manufacturing Company.



Model 15-G-1120: Standard Gear Ratios

SPLITS—OVER-HIGHWAY				LOW RANGE—OFF-HIGHWAY		
Speed	Split	Ratio	% Step	Speed	Ratio	% Step
10th	O'Drive-High	.636	33	5th-Low	1.33	
9th	O'Drive-Int.	.844	19			57
8th	Direct-High	1.00	33	4th-Low	2.09	
7th	Direct-Int.	1.327	32			76
6th	3rd-High	1.76	33	3rd-Low	3.68	
5th	3rd-Int.	2.32	41			86
4th	2nd-High	3.27	33	2nd-Low	6.83	
3rd	2nd-Int.	4.33	51			100
2nd	1st-High	6.54	33	1st-Low	13.67	
1st	1st-Int.	8.68				

Model 15-H-1120: Standard Gear Ratios

SPLITS—OVER-HIGHWAY				LOW RANGE—OFF-HIGHWAY		
Speed	Split	Ratio	% Step	Speed	Ratio	% Step
10th	O'Drive-High	.636	33	5th-Low	1.68	
9th	O'Drive-Int.	.844	19			57
8th	Direct-High	1.00	33	4th-Low	2.64	
7th	Direct-Int.	1.327	32			76
6th	3rd-High	1.76	33	3rd-Low	4.65	
5th	3rd-Int.	2.32	41			86
4th	2nd-High	3.27	33	2nd-Low	8.63	
3rd	2nd-Int.	4.33	51			100
2nd	1st-High	6.54	33	1st-Low	17.27	
1st	1st-Int.	8.68				

Optional Gear Ratios: Models 15-G-1120, 15-H-1120

Overdrive: .85, optional at extra cost
Overdrive: .74
Reverse: 5.06

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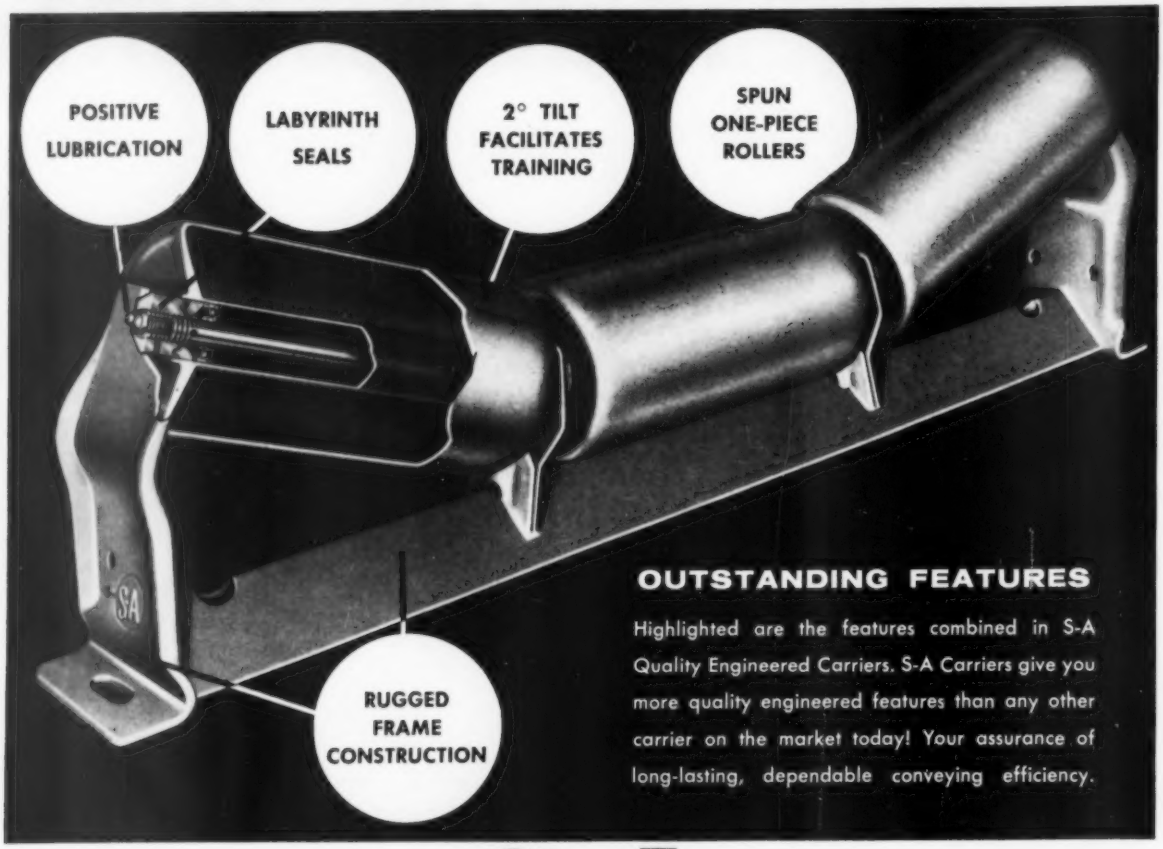

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Highlighted are the features combined in S-A Quality Engineered Carriers. S-A Carriers give you more quality engineered features than any other carrier on the market today! Your assurance of long-lasting, dependable conveying efficiency.

STEPHENS-ADAMSON

Quality Engineered CARRIERS

Maximum conveying efficiency and profitable bulk handling over the belt depends on what's under the belt in quality-engineered conveyor components. No single component has a greater bearing on conveyor performance than the carriers, carrying the load. The combination of features you see highlighted in the cutaway view above, are available in no other carrier on the market. The result is smooth performance, simplified and reduced maintenance, longer carrier life and less handling cost per ton. STEPHENS-ADAMSON Carriers are available in a wide range of sizes in both ball and roller bearing carriers . . . stocked for immediate delivery.

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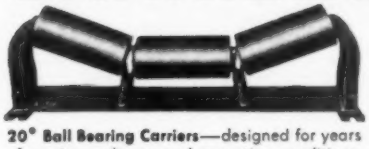
WRITE FOR PULLEY BULLETIN 558



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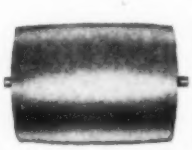

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SPEEDWALK® PASSENGER CONVEYORS
SEALMASTER® BALL BEARING UNITS
SPHERCO® BEARINGS & ROD ENDS

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and load out as never before

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with REVERSE O TORC

It's rated ¾-yd. at the bucket. But that's only the half of it.

The fast-action Oliver 778 loader has a loading speed that upgrades production comparable to larger, far more expensive loaders.

Oliver "Reverse-O-Torc" puts instantaneous forward-reverse action under finger-tip control of the operator—*entirely minus conventional clutching!* It's so easy: full-force crowding into the bank with smooth torque converter power...a flick of the finger for fast back-away and dumping...then "flick," right back for another heaping load. Big, steady, low-cost production.

By all means, get the full facts on the Oliver 778 before you buy any loader—even larger. Choice of 50-plus horsepower gasoline or diesel engine. See your helpful Oliver distributor.

LOOK TO OLIVER FOR YOUR BEST BUY IN WHEEL AND CRAWLER TRACTORS

THE OLIVER CORPORATION

Dept. 2232, 400 W. Madison St., Chicago 6, Illinois

Ask a hard rock driller what he likes about a

TRACDRIL

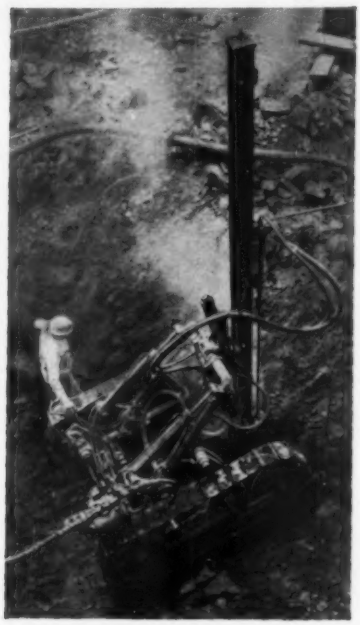
—He'll answer:

OPERATING EASE

and

SAFETY!

DRILLERS LIKE automatic brake on CP Tracdril that grabs and holds instantly when controls are released. Standing or drilling, the rig holds firm.



DRILLERS LIKE the way 6" channel constructed drill carriage provides rigid, steady mounting . . . eliminates distortion, resists crowding and prevents sag during horizontal operations. Feed always even. If steel breaks, drill will not plunge.

Here's "designed-in" safety. Release tramming motor throttle on CP Tracdril and multiple disc brake slams on instantly, automatically. No possibility of moving when rig is standing or drilling.

Dual control panels keep all hydraulic positioning levers within easy reach—drilling or tramming. U-Arm mounting lets operator convert fast from "hard high horizontals" to "snake holes". Two 6 HP "Power Vane" reversible motors give top tractive effort. Hard hitting CP-450DR Deep Hole Drill uses coupled drill steel, sinks 3-inch holes to 75 feet. Get complete information on Tracdrils from your CP equipment distributor, or write to *Chicago Pneumatic Tool Company, 8 East 44th Street, New York 17, N. Y.*

DRILLERS LIKE easy hole-spotting of CP Tracdril and the "deadman controls" insure operator safety. Drill moves ahead, backs, turns, pivots at a touch. Easily hauls 600 c.f.m. compressor up 10% grade.

Chicago Pneumatic

AIR COMPRESSORS • PNEUMATIC TOOLS • ROCK DRILLS • DIESEL ENGINES • ELECTRIC TOOLS • BLAST HOLE DRILLS • PUMPS • AIR-BLAST BITS

News of the Industry

Green Bag Cement Div. Of Pittsburgh Coke-Chem. Becomes Firm's Subsidiary

The formation of Green Bag Cement Company, a wholly-owned subsidiary of Pittsburgh Coke & Chemical Company, was announced recently by Robert M. Moore, vice-president of Pittsburgh Coke's Cement and Concrete Products Group. (Green Bay was formerly a division of the parent company.)

Louis R. Forbrich has been named vice-president of the cement company and continues as general manager.

As part of an intensified marketing program, a new warehousing facility was completed at Marietta, Ohio, and plans were approved for additional distribution facilities. Green Bag sales increased 17 percent in 1959 over the previous year.

Kaiser Periclase Plant Opened at Midland, Mich.

Kaiser Refractories & Chemicals' new $3,000,000 periclase plant at Midland, Mich., is now on stream. This plant, under construction since last summer (See PIT AND QUARRY, June, 1959, page 32), has an annual capacity of 45,000 tons of periclase and refractory magnesias. It represents Kaiser's fifth major expansion of its basic refractories operations in five years. Magnesium hydroxide in slurry form (furnished by Dow Chemical Company's Midland plant) is utilized.

The Midland operation includes a 275-ft. rotary kiln and associated filtering equipment and handling facilities.

Principal product is periclase, a crystalline, hard-burned magnesia which is one of the raw materials used in the manufacture of refractory brick mixes. The periclase will be shipped to the Kaiser Refractories and Chemicals plant in Columbiana, Ohio, which has been expanded to include additional pressing and raw material-handling facilities. Other products include magnesite and refractory-grade magnesias.

The $3,500,000 gypsum plant going up at Rosario, N. M., for Kaiser Gypsum Company was nearly ready for production early in April. Construction is under way on the last few projects at the site.

More than $110,000 in unrestricted grants-in-aid is being distributed by Hercules Powder Company among 30 colleges and universities. The funds will be used with complete freedom by the heads of departments of chemistry, chemical engineering, physics, mechanical engineering, and other sciences to achieve new levels in their fields.

Consolidated Quarries Made Operating Division Of Georgia Marble Co.

Consolidated Quarries Corporation, Decatur, Ga., has been merged with The Georgia Marble Company, Tate, Ga. Consolidated will continue operation of granite crushing plants at Lithonia and Douglasville, Ga., as a division of Georgia Marble.

Nelson Severinghaus, a vice-president of Georgia Marble, will be manager of Consolidated Quarries Division. G. A. Austin, a director of Georgia Marble, will act as consultant to the new division.

The parent firm was organized in 1884. It presently operates dimension marble, limestone, and serpentine quarries in Georgia, Alabama, Tennessee, Missouri, Virginia, and Vermont. Calcium products are also made at the Georgia and New York quarries.

Coming Events

May 17-19, 1960 — Milwaukee. Second Technical Conference of Cement Industry Sub-Committee, The American Institute of Electrical Engineers. Hotel Pfister.

May 23-25, 1960 — Sea Island, Ga. Annual convention, National Lime Association. The Cloisters.

June 13-14, 1960 — Chicago. Board of directors meeting, National Limestone Institute, Inc. Edgewater Beach Hotel.

June 26-July 1, 1960 — Atlantic City. 63rd annual meeting and apparatus exhibit, American Society for Testing Materials, Chalfonte-Haddon Hall.

July 17-20, 1960 — Kiamesha Lake, N.Y. Midyear meeting, National Bituminous Concrete Association. Concord Hotel.

July 20-23, 1960—White Sulphur Springs, W. Va. Midyear meeting, N.C.S.A. board of directors. The Greenbrier.

October 3-5, 1960 — Pebble Beach, Calif. Semi-annual meeting, National Sand and Gravel Association board of directors. Del Monte Lodge.

Feb. Construction Awards Show 3 Percent Dip F. W. Dodge Corp. Reports

February future construction contracts in the United States (excluding Alaska and Hawaii) totaled $2,239,534,000, down 3 percent from February, 1959. This is the seventh consecutive month showing a drop in award totals, as compared to year-earlier months.

Gains in the heavy engineering sector highlighted activity in contracts, according to F. W. Dodge Corporation. But these gains were more than offset by decreases in the building categories, both residential and non-residential.

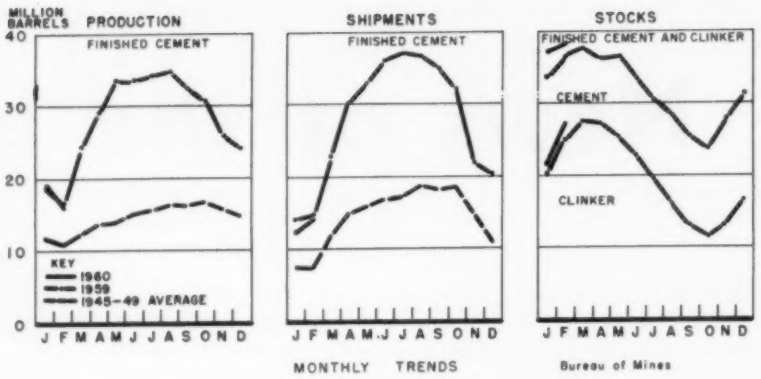
After adjustment for normal seasonal patterns, however, the February figures were at about the same level as in January of this year, with the Dodge Index reported at 234 compared with 235 in January and 244 in December, 1959 (1947-49=100).

ITEM: heavy engineering contracts amounted to $554,456,000—up 5 percent from February, 1959. An optimistic fact—notable gains were registered in contracts for highways, and electric light and power systems.

ITEM: housing contracts fell 8 percent from the corresponding 1959 month—to $987,577,000.

ITEM: non-residential building contracts dipped 1 percent to $697,501,000. Declines in factories, schools, and hospitals offset impressive gains in most other building types in this category.

CUMULATIVE TOTALS for the first two months of 1960 and the percentage changes from the corresponding period of last year: total construction, down 4 percent to $4,429,249,000; housing, down 9 percent to $1,913,430,000; non-residential building, down 2 percent to $1,496,929,000; and heavy engineering, up 1 percent to $1,018,890,000.



—February, 1960, Finished Portland Cement—

SUMMARY—Production of finished portland cement in February, 1960, as reported to the U. S. Bureau of Mines, totaled 16,080,000 barrels—a decrease of 4 percent compared with February, 1959. Mill shipments totaled 14,576,000 barrels—a decrease of 1 percent compared with February, 1959. Stocks of 38,666,000 barrels of finished portland cement on hand February 29, 1960, were 5 percent higher than those on hand February 28, 1959. Clinker production during February, 1960, totaled 21,458,000 barrels—a decrease of 0.3 percent compared with February, 1959.

PRODUCTION—One hundred and forty-eight (148) plants in 37 states and Puerto Rico reported a production of 16,080,000 barrels of finished portland cement during February, 1960, compared with 16,710,000 barrels produced in February, 1959.

Production of clinker was 21,458,000 barrels, compared with 21,522,000 barrels during the same month last year.

High-early-strength portland cement totaled 1,119,000 barrels—an increase of 6 percent over the February, 1959, production.

Prepared masonry cement production of 683,000 barrels decreased 17 percent from the February, 1959, production.

SHIPMENTS—Mill shipments of finished portland cement for February, 1960, were reported by one hundred and seventy-one (171) plants and totaled 14,576,000 barrels—compared with 14,785,000 barrels in February, 1959.

Shipments were higher in 13 districts and lower in 10 districts. The greatest increases were in the New York-Maine and Michigan districts. The greatest decreases were in the Kansas, western Missouri-Nebraska-Oklahoma-Arkansas, and Tennessee districts.

Mill shipments of high-early-strength portland cement totaled 956,000 barrels—an increase of 19 percent over the 806,000 barrels shipped in February, 1959.

Mill shipments of prepared masonry cement totaled 738,000 barrels—a decrease of 10 percent from the 817,000 barrels shipped in February, 1959. Eighty-three percent of these shipments were from mills east of the Mississippi River. Prepared masonry cements are shown in 376-lb. barrels although they are sold in barrels of varying weights.

STOCKS—Mill stocks of 38,666,000 barrels of finished portland were on hand February 29, 1960—an increase of 5 percent over the 36,680,000 barrels on hand February 28, 1959. Stocks of clinker on hand February 29, 1960, totaled 27,396,000 barrels—an increase of 9 percent over the 25,183,000 barrels on hand February 28, 1959.

FIRST TWO MONTHS OF 1960—For the January-February period, the volume of production of finished cement amounted to 34,749,000 barrels, compared with 35,314,000 barrels in the comparable period of 1959. Total shipments for the first two months of 1960 are reported at 27,342,000 barrels; in the same period of 1959 total shipments were 29,201,000 barrels. (Shipments figures do not include finished cement used in the manufacture of prepared masonry cement, as follows: February, 1959—158,000 barrels; January-February, 1959—286,000 barrels. February, 1960—122,000 barrels; January-February, 1960—265,000 barrels.) ●

3 Promoted on Sales Staff Of General Crushed Stone

The following changes in the sales personnel of the General Crushed Stone Company, Easton, Pa., have been announced.

Thomas C. Foote, formerly assistant to the vice-president, John Rice Jr., has been appointed general sales manager.

J. Walter Harward, formerly district sales manager at Glen Mills, Pa., has been promoted to the post of division sales manager, in charge of the territories served by Glen Mills and Rock Hill, Pa., Newport, Del., and Verdon, Va.

Charles A. Reid, who was previously sales engineer at Glen Mills, has succeeded Mr. Harward as district sales manager at Glen Mills.

Maule Truck Drivers Cited For Nine-Year Safety Records

Since the inception of the safety award program of Maule Industries, Inc., Miami, Fla., 147 safe driving pins have been awarded to company employees for accident-free records. Award winners have driven a total of 13,500,000 miles.

The six top drivers, who have received nine-year pins, are Bernell J. Filer, Gilbert O. King, Clifton Huggins, Kenneth Hulsey, Hubert Hall, and Everett Griffis.

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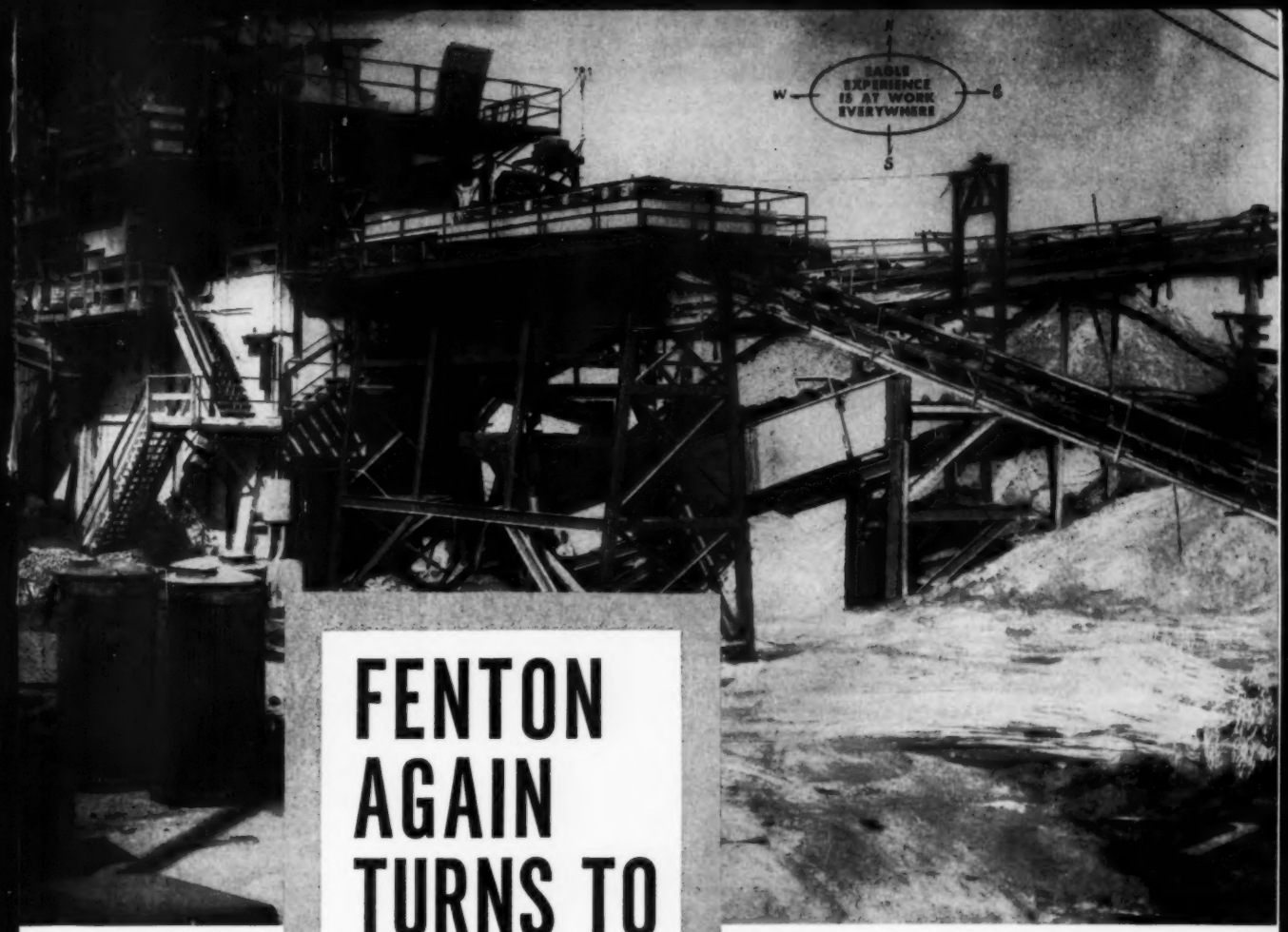

FENTON AGAIN TURNS TO EAGLE

for SAND PROCESSING EQUIPMENT

The progressive H. G. Fenton Material Co., San Diego, Calif., is an important West Coast aggregate producer. They have extensive equipment at their various plants and have ample opportunity to evaluate its performance.

They first installed Eagle sand washing equipment in 1957. Recently they installed the Eagle Sand Washing-Classifying-Dehydrating Section shown. It was readily linked up with the existing crushing and screening plant.

The 32′ Eagle Water Scalping-Classifying Tank is equipped with 3-cell Collecting-Blending Flume and easy-operating Metering "Splitter" Gates. It is performing satisfactorily. Final classification and dehydration of the concrete sand is accomplished in a 54″ screw diameter x 32′ long Screw Washer-Classifier-Dehydrator.

Eagle not only designs and builds aggregate processing equipment, but assists in its proper application. As pioneers in the field Eagle is well qualified to give counsel—producers coast-to-coast have learned "the easy way" that they can bank on Eagle's recommendations. *Send us a 10 lb. sample of your material for a free run through our laboratory and a report. Ask for Catalog.*

Factory-Trained Distributors Everywhere

EAGLE IRON WORKS

ENGINEERS • MANUFACTURERS

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SINCE 1872

EIW

EAGLE IRON WORKS

FINE MATERIAL WASHER-CLASSIFIER-DEHYDRATORS • WATER SCALPING-CLASSIFYING TANKS • COARSE MATERIAL SCREW WASHERS • H.M.S. PLANTS

• This new crushed stone facility at the McCook (Ill.) quarry of Consumers Division, Vulcan Materials Company, which involved an investment of more than $5,000,000 and required two years to build, is now in production. Rated at 1,600 t.p.h. and equipped with the latest in electronic controls, the plant has more than doubled the capacity of the old plant (now dismantled), with the same work force.

Clint A. Allen Succumbs After Lingering Illness

Clint A. Allen, executive secretary of the Iowa Limestone Producers Association, died on March 15 in a hospital in Des Moines.

Mr. Allen was executive secretary of the original Iowa Agricultural Limestone Association from the time of its inception in 1946 and was largely responsible for its growth into one of the largest and most active state groups in this field.

Clint A. Allen

• • • • •

Our Cover Picture

This month our cover picture illustrates the last step in the production and marketing of agricultural limestone—one of the two important nonmetallic commodities featured in several articles of our annual May lime and agstone issue. It would be difficult to over-emphasize the critical role played by liming materials in improving the nation's soils—a point amplified in various discussions contained in the lime and agstone insert. Despite their known importance, these materials, unfortunately, have been too long treated as "poor relations" in the agricultural "family." Steps to improve that condition are detailed by various agriculture authorities in analytical discussions carried on later pages of this issue.

Lime Sales in January, 1960

Lime sold and used in January, 1960—973,659 short tons—decreased, compared to the previous month's output, which was an all-time record, according to reports submitted by producers to the United States Bureau of Mines.

Chemical and other industrial lime increased, whereas decreases were noted in agricultural, refractory, and construction lime.

Lime Sold and Used by Producers* in the United States, in Specified Periods of 1959-60, by Types and Major Uses in Short Tons

	November 1959	December 1959	January 1960	January 1959
By types:				
Quicklime	670,267	828,909	777,189	569,923
Hydrated lime	154,312	172,405	196,470	132,660
Total lime	824,579	1,001,314	973,659	702,583
By uses:				
Agricultural:				
Quicklime	2,851	3,782	2,198	3,059
Hydrated lime	2,968	6,453	4,170	4,146
Total	5,819	10,235	6,368	7,205
Construction:				
Quicklime	6,696	6,354	6,604	11,479
Hydrated lime	68,349	66,938	61,303	56,533
Total	75,045	73,292	67,907	68,012
Chemical and other industrial:				
Quicklime	472,981	562,945	539,447	366,483
Hydrated lime	82,995	99,014	130,997	71,981
Total	555,976	661,959	670,444	438,464
Refractory (dead-burned dolomite)	187,739	255,828	228,940	188,902

*The monthly canvass excludes the output of plants producing less than 10,000 tons a year.

Safe Driving Practices Stressed in Movies Starring Maule Drivers

One of the first movies on safe driving specifically tailor-made for a building supply company has been completed for Maule Industries, Inc., major Florida nonmetallic materials and concrete products firm. Based on driving recommendations made to Maule by the Travelers Insurance Company, the 12-minute film emphasizes safe driving practices and the role played by Maule drivers in improving highway courtesy.

This film, which is to be used primarily for driver training at Maule, features regular drivers and standard equipment in the cast. Maule management plans to make the film available to local groups concerned with improving their safety record.

The following features are highlighted in the film:

1. Follow prescribed procedures for checking all safety accessories before starting out in the morning.
2. Drive a safe distance behind other vehicles. "Tail-gating" is the most frequent cause of rear-end collisions.
3. Keep attention on the road while driving, to get the "big picture" up ahead.
4. Check carefully any area to be backed into. Pay special attention to lateral clearances. Wherever possible, some one else should guide the driver as he backs his truck.

D. Harrington Dies at 81— Famed Mine Safety Expert

Daniel Harrington, 81, nationally recognized for promotion of mine safety, died recently in Arlington, Va. Mr. Harrington was chief of the health and safety division of the U. S. Bureau of Mines, Washington, D. C., when he retired in April, 1948. He had lived in Arlington since his retirement.

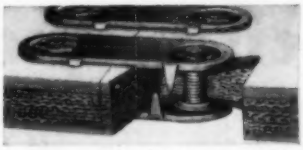
After working as an engineer for coal companies in Utah and Wyoming, Mr. Harrington joined the Bureau of Mines in 1914. He was named chief safety engineer in 1926, and chief of the health and safety division in 1935.

He was cited in 1948 for his contributions in mining safety in special ceremonies at the Bureau of Mines.

BELT INSTALLATION MEN LIKE TO WORK WITH...

FLEXCO® BELT FASTENERS

Lowell Lynde, Service Engr., Barber-Greene Co. completing the installation of a FLEXCO splice.



Cutaway of a FLEXCO application showing the compression plates, teeth and precision-made bolts and nuts.

He says, "I've spliced most of the belts our Chicago office has sold throughout Illinois and northern Indiana. FLEXCO fasteners have been used on all of them without any trouble. They are easy to install and hold up well regardless of the material conveyed."

PROTECT YOUR INVESTMENT IN CONVEYOR BELTS WITH FLEXCO . . . the quality fastener for all heavy-duty conveyor belt applications: COAL & METALS, SAND & GRAVEL, CRUSHED ROCK, CONSTRUCTION EQUIPMENT, etc.

Available in Steel, Monel, Stainless, Everdur. Also Promal top plates.

FLEXCO "25-PAK"

"25-PAK" contains enough fasteners to join common belt widths.

ORDER FROM YOUR DISTRIBUTOR, OR WRITE TO US FOR BULLETIN F-112.

"FOR THE SPLICE OF A LIFETIME"

Flexible STEEL LACING COMPANY

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WHICH IS BEST
3 new series Cat Motor Graders

NEW
No. 12
Series E
115 HP

NEW
TURBOCHARGED
No. 112
Series F
100 HP

NEW
No. 112
Series E
85 HP

for higher production, easier servicing and long life!

No machine is better than its engine—and the new Cat Diesel Engines in these three new series Motor Graders are better than ever. They're more compact, more rugged and modern in design. They incorporate the latest developments in metallurgy and technology. They provide three important bonuses—greater lugging ability in tough going, easier servicing and long life.

A COMPLETE LINE—85 HP to 150 HP

The new Turbocharged 100 HP No. 112F is designed for high production to match work requirements between the new 85 HP No. 112E and new 115 HP No. 12E. Compared with the 85 HP model, the 100 HP machine delivers 5% higher travel speeds and a 5% increase in blade speed control. With its introduction into the line, Caterpillar now offers you a choice of four Motor Graders in all to meet your specific requirements. The largest is the Turbocharged 150 HP No. 14, the most versatile big grader ever developed.

SEE YOUR CATERPILLAR DEALER

Some of the features of the new Cat Motor Graders are described briefly here. But for the complete picture, see your Caterpillar Dealer. Ask him to show you how they're a better buy for your money than ever. Take a look under the hoods at the new modern-design engines. Better still, ask for a demonstration.

See how they "pull through" tough going.

Caterpillar Tractor Co., General Offices, Peoria, Ill.

CATERPILLAR

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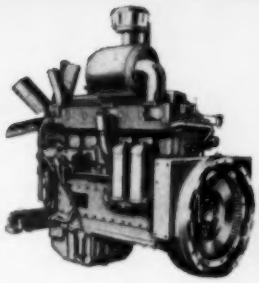
MODERN HEAVY-DUTY MOTOR GRADERS TO FIT ANY JOB

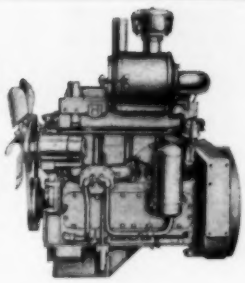
FOR YOUR JOB?
with new compact engines!

New No. 12E Motor Grader features new compact 115 HP Engine



New No. 112E Motor Grader features new compact 85 HP Engine

The new No. 112F is similar in appearance, but features a Turbocharged 100 HP Engine.

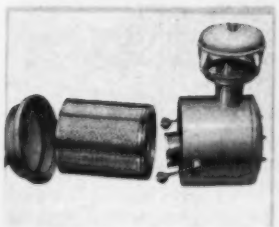


NEW HIGH TORQUE. Though the engines in the new Cat Motor Graders are designed specifically for each machine, they all develop higher torque than previous models and have other basic improvements in common. For example: shorter, stiffer blocks and crankshafts... stronger, distortion-resistant cylinder heads... improved cooling systems with greater capacity... engine lubricating oil conditioning... and advanced design fuel systems —new, compact fuel injection pumps with barrel and plunger assemblies in easy-to-service pump housings.

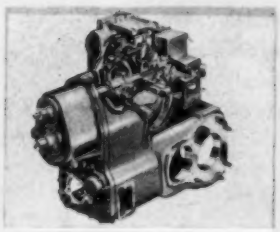
NEW STARTING ENGINE. Now standard is a new two-cylinder, vertical starting engine to replace the horizontal engine. All three Motor Graders use a modern 12-volt electric system. An optional 24-volt system is available for use in moderate climates where direct electric starting is practical.

PERFORMANCE-PROVED FEATURES. While many advances have been designed into the compact new engines, certain time-tested features have been retained. To mention a few: precombustion chamber design that delivers maximum horsepower on heavy, economy-type fuels... steel-back aluminum bearings... wet-type "Hi-Electro" hardened cylinder liners... and aluminum pistons with cast-in ring band.

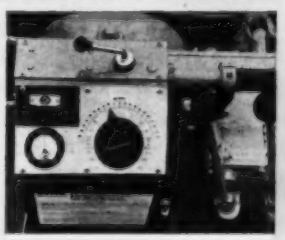
OTHER HIGH-PRODUCTION FEATURES IN CAT MOTOR GRADERS



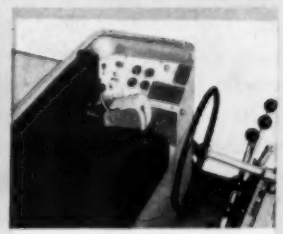
NEW DRY-TYPE AIR CLEANER (standard) removes a minimum of 99.8% of all dirt from intake air during every service hour. Can be serviced in 5 minutes. Cuts your maintenance time by as much as 70% and substantially reduces maintenance costs. Cleaner air also extends engine life.



EXCLUSIVE OIL CLUTCH (standard) provides up to 2000 hours service without adjustment, the equivalent of about 12 months of "adjustment-free" operation. A Caterpillar development proved by millions of hours of use, it virtually eliminates down time for clutch repair.



AUTOMATIC BLADE CONTROL (optional) cuts grading time in half. Operator sets desired slope on dial and only has to control depth of cut. Manufactured by Preco Incorporated, the unit automatically maintains blade slope within ⅛" in 10'. Available factory installed.



IN-SEAT STARTING (standard) offers operator finger-tip convenience and positive starts in any weather. Another feature: improved mechanical blade controls provide precise adjustment and ease of engagement. "Anti-creep" lock makes blade stay put under load.

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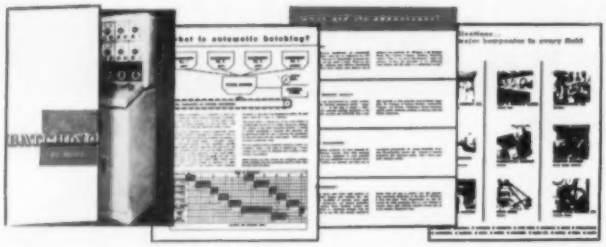
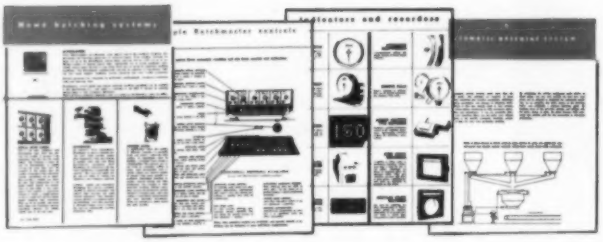
AUTOMATIC



BATCHING



HANDBOOK

Everything you need to know about Automatic Batching
How to do it

How much it costs
What you need

How to use what you have
How to select the right system

If you are now combining two or more ingredients in any kind of formula or batch, write now for this new automatic batching handbook. It describes in detail how automatic batching works, how to convert existing plant facilities or plan new plants for automatic operation. It illustrates the latest batching systems available, helps you select the right type for your particular needs. Also shows you how to combine materials handling equipment, storage facilities, and weighing equipment for greatest economy, increased production. This is the newest, most complete handbook on automatic batching available—be sure to write for your free copy today!

HOWE

THE HOWE SCALE CO., RUTLAND, VT.
A SUBSIDIARY OF AMERICAN MANUFACTURING COMPANY, INC.
HOWE SCALES OF CANADA, MONTREAL, QUE.

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Plant Safety Record Set For Gypsum Industry Despite More Man-Hours

The gypsum industry established a new safety record in 1959, according to the Gypsum Association, which reports that the 61 plants of the industry achieved a 16 percent reduction in the disabling injury frequency rate from the 1958 all-time low rate.

The industry's 1959 frequency rate, which is based on the number of disabling injuries per 1,000,000 man-hours worked, dropped to 3.47 from the 1958 rate of 4.13. This reduction was achieved despite the fact that there was an increase of approximately 11 percent over 1958 in total man-hours worked.

The figures, reported in the association's annual safety contest, showed that 24 plants achieved perfect frequency rates of 0; and 36 plants achieved the 1959 industry frequency rate goal of 3.0. Sixteen of the 24 plants with perfect records repeated this unmarred performance two years in a row; and 7 plants have carried this record since 1957.

The Gypsum Association reported that only 95 lost-time accidents occurred in 1959 in the 61 gypsum plants.

Four gypsum operations were awarded trophies by the association for their records in their respective contest groups, which are based upon plant production time. The winning plants having the highest number of man-hours worked without a disabling injury in each of the four groups included the following:

Edgewater (N.J.) plant of Barrett Division, Allied Chemical Corporation

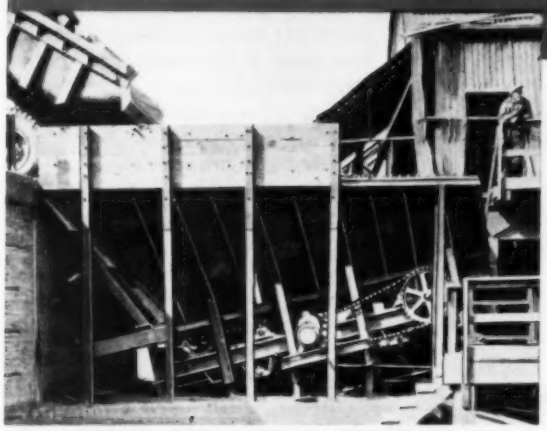
Burlington (N.J.) plant of National Gypsum Company

New Brighton (N.Y.) plant of United States Gypsum Company

East Chicago (Ind.) plant of United States Gypsum Company

In addition, the Savannah (Ga.) plant of National Gypsum Company was presented a trophy for showing the greatest improvement in its safety record during the last year, when compared with the average of the three previous years. The plant showed a 60 percent improvement in frequency rates over the last three years.

TELSMITH®
more economical feeders



NEW ENTERPRISE STONE & LIME CO., ASHCOM, PA.—36-in. x 10-ft. Telsmith Heavy Duty Apron Feeder takes 15-ton loads; feeds a 25-B Telsmith Primary Crusher.

● Keep your conveyors, screens and crushers working smoothly and at full capacity. Telsmith Apron or Plate Feeders insure steady, uniformly regulated flow of material to entire plant—boost your output and cut cost of up-keep.

APRON FEEDERS are self-contained units on heavy structural steel frames. **Heavy-Duty Apron Feeders**—with carbon, or manganese steel flights—handle the toughest jobs, such as feeding primary crushers, either jaw or gyratory. **Standard-Duty Apron Feeders**—equally sturdy, but weigh less. Apron Feeders are made in 24-in. to 72-in. widths, with capacities from 25 to 800 tons per hour. Furnished with heavy steel hoppers, at extra cost.

PLATE FEEDERS are simple in design—sturdy in construction. Adjustable stroke regulates capacity. Made in both Standard and Heavy-Duty models; widths 16-in. to 60-in.; capacities 12 to 740 cu. yds. per hr.

Send for Bulletin 266

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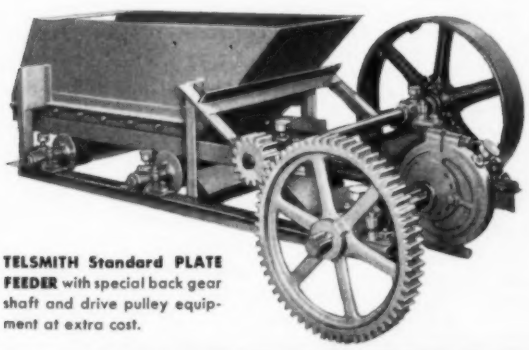
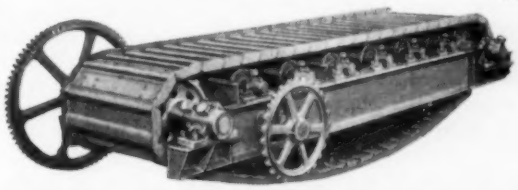


TELSMITH Standard PLATE FEEDER with special back gear shaft and drive pulley equipment at extra cost.



TELSMITH Standard-Duty APRON FEEDER—Raised edges of its ⅜-in. steel flights prevent spillage.

SMITH ENGINEERING WORKS

504 E. CAPITOL DRIVE **MILWAUKEE 1, WISCONSIN**

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Carrier Amplitrol Grizzly-Feeder for use with crushers separates undersized material. Tapered bars minimize blinding. Feeder control allows manual or automatic capacity control at any distance from feeder.

CARRIER *GRIZZLY*-FEEDER

with full-range capacity control

Carrier Amplitrol Grizzly-Feeders accurately control material flow rates and simultaneously scalp "fines"—assuring maximum crusher capacity and efficiency. Uniform, full-width feeding prevents uneven crusher wear. Simple, automatic controls respond instantly to crusher load fluctuations—constantly adjust Amplitrol output to produce peak crusher performance without flooding or starving.

Compare These Amplitrol Features

More capacity under head load with Natural Frequency design and *"long-stroke"* trough vibrations.

Dust- and dirt-proof drive—no close clearances to keep clean.

A.C. drive motor operates on standard power circuits—no D.C. rectifying equipment required.

Simple mechanical drive—Amplitrol drives never need "tuning." Wear plates can be added in the field without difficulty.

For more information, write for Bulletin No. 591 to Carrier Conveyor Division, CHAIN Belt Company, 218 North Jackson St., Louisville 2, Ky.

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Volpe, Miller Installed As A.G.C. President, V.-P. During 41st Convention

John A. Volpe and M. Clare Miller were recently installed as president and vice-president respectively, of the Associated General Contractors of America. The occasion was A.G.C.'s 41st annual convention, held March 21-24 in San Francisco; it was attended by approximately 2,300 persons.

Mr. Volpe, a contractor in Malden, Mass., and a former federal highway administrator and commissioner of public works in Massachusetts, served as A.G.C. vice-president during the last year. He is president of the John A. Volpe Construction Company, Washington, D. C. James W. Cawdrey is the immediate past-president of A.G.C.

Mr. Miller is a registered professional engineer, and heads San Ore Construction Company, Inc., McPherson, Kans.

New officers were also elected to head the three occupational divisions of A.G.C.: highway division—H. L. Royden, Phoenix, Ariz., chairman; R. W. McKinney, Nacogdoches, Tex., vice-chairman; building division—Carl W. Olson, Lincoln, Nebr., chairman; Fred W. Mast, Waterloo, Iowa, vice-chairman; heavy division—F. S. Oldt, Dallas, Tex., chairman; Carl M. Halvorson, Portland, Oreg., vice-chairman.

Great Western Aggregates Building Light Aggregate Plant

Great Western Aggregates (a wholly-owned subsidiary of Ideal Cement Company) has awarded a contract for the erection of a lightweight aggregate producing plant near Denver, Colo. (See PIT AND QUARRY, October, 1959, p. 26) Annual capacity will be 300,000 cu. yd. of Idealite lightweight aggregate, with provision for rapid doubling of capacity.

Construction of the plant will begin early in May; Martin K. Eby Construction Company has been awarded the building contract.

Major features will consist of the following: a 12- by 240-ft. rotary kiln; a 9½- by 150-ft. rotary cooler; a crushing plant with a capacity of more than 200 t.p.h.; and four 40- by 135-ft. concrete storage silos.

1959 Reports Show Good Year
1960 to Maintain Level

Corporate profits in 1959 staged a brisk recovery from 1958's business recession. The *Wall Street Journal* reported an 18.9 percent combined increase in profits of 545 corporations. Individual producers in the nonmetallic minerals industry also had a good year, according to recently released annual reports. Practically all sales and earnings in the table below are new highs for the companies listed.

Here are some highlights. Alpha Portland Cement Company's net sales and earnings were the highest in the firm's 65-year history. Sales were up 19 percent over 1958, and shipments rose 17 percent, while the whole cement industry showed a general 9 percent shipment increase. Basic Incorporated reported record earnings, and December refractory sales were at a greater rate than in any previous month.

Permanente Cement Company celebrated its 20th year of operations by marking new records in both sales and earnings—sales were up by almost $10 million. Ideal Cement Company reached a new peak in cement shipments, which were 11½ percent above 1958.

In general, nonmetals firms are expecting slightly higher sales and earnings in 1960, mainly from added capacity. The *Wall Street Journal* expects this year's first quarter profit-gains to be small. But although most firms will have reached a temporary profits plateau, earnings will match or slightly exceed 1959's record level. This optimism is reflected in the announcements of many firms planning capital outlays for continued expansion.

	1959—Sales—1958		1959—Net Earnings[1]—1958		Per Share 1959 — 1958	
Alpha Portland	$ 39,410,000	$ 33,218,000	$ 7,379,000	$ 4,906,000	$4.14	$2.75
American-Marietta	323,647,751	251,417,000	24,027,872	17,582,000	2.03	1.62
American Cement	56,779,898	51,834,607	6,817,348	6,718,181	1.57	1.55
Basic Inc.	25,585,742	19,576,206	2,118,399	1,102,281	1.81	.97
Bessemer Lst. & Cement	11,952,481	9,970,000	1,968,504	1,668,345	4.91	4.15
Bestwall Gypsum	39,421,296	34,925,376	4,818,779	4,268,811	2.40	2.17
Certain-Teed	100,767,206	88,369,346	3,374,549	1,916,466	1.69	.96
Colonial Sand & Stone	51,182,162	42,147,264	2,639,551	1,400,841	2.50	1.33
Consol. Rock Prod.	28,171,994	24,748,333	1,923,885	1,400,155	2.02	1.47
Duval Sulphur & Potash	19,055,268	12,626,268	2,348,576	2,644,645	1.81	2.03
Flinkote	221,075,187	194,071,638	14,285,527	12,230,165	2.61	2.24
General Portland	67,191,738	59,272,146	12,057,264	11,154,837	2.27	2.13
General Refractories	56,000,000[2]	49,300,000	4,500,000[2]	3,590,436	1.61[2]	1.28
Gladding, McBean	35,417,000	30,335,000	2,930,000	1,703,000	1.83	1.07
A. P. Green Fire Brick	39,400,000	34,128,337	2,575,000	2,107,089	2.35	2.16
Halliburton Oil Well Cementing	192,478,855	179,012,513	15,776,820	14,428,833	3.75	3.43
Harbison-Walker Refractories	87,909,687	79,161,939	9,132,447	8,731,091	2.96	2.83
Ideal Cement	108,515,533	97,826,078	20,525,364	18,560,103	1.83	1.65
Int. Min. & Chem.[3]	47,691,915	43,655,292	1,727,966	701,460	.85	.22
Johns-Manville	377,562,000	331,743,000	31,616,000	23,374,000	3.74	2.83
Lehigh Portland	101,019,000	91,771,000	12,131,000	8,816,000	2.88	2.11
Lone Star Cement	104,240,826	97,137,493	17,076,137	16,225,352	2.20	2.09
Marquette Cement	57,236,728	53,059,882	9,490,897	8,742,434	3.55	3.26
Medusa Portland	40,093,212	39,786,142	4,704,785	4,873,058	2.80	2.91
Min. & Chem. Corp.	17,393,002	15,413,708	2,095,076	1,342,661	1.01	.65
Minn. Mining & Mfg.	500,675,932	376,293,016	63,564,729	43,879,033	3.74	2.58
Missouri Portland	22,517,558	20,673,618	5,010,530	4,630,695	3.16	2.92
National Gypsum	226,277,806	163,164,450	25,561,678	16,614,713	4.56	3.53
Pacific Cem. & Agg.	32,516,998	28,120,898	2,284,522	2,006,728	1.89	1.66
Penn-Dixie Cement	51,599,243	47,033,086	9,528,952	8,546,831	3.42	3.07
Permanente Cement	77,164,000	67,359,000	10,343,000	9,425,000	1.81	1.65
Penna. Glass Sand	17,194,157	12,954,952	2,950,685	2,372,846	1.67	1.39
Pittsburgh Coke & Chem.	70,023,000	45,513,000	2,725,000	1,298,000	1.98	.75
Potash Co. of A.[3]	7,489,785	8,921,606	808,400	934,778	.52	.81
U.S. Gypsum	301,025,817	265,763,385	46,343,451	40,926,381	5.70	5.05

[1]After taxes. [2]Estimated. [3]For first 6 mo. of fiscal year (to Dec. 31, 1959).

N.B.C.A. Midyear Meeting Scheduled for July 17-20

The mid-year meeting of the National Bituminous Concrete Association will be held July 17-20, 1960, at the Concord Hotel, Kiamesha Lake, N. Y. An expected feature of the meeting will be the announcement of the location for the association's new research headquarters.

The group, composed principally of bituminous concrete paving contractors here and abroad, officially launched a $1,300,000 Quality Improvement Program last February in Detroit at its fifth annual convention. (See story on pages 85-86 of this issue.) Some research is already in progress under the organization's own auspices.

Two Ohio Distribution Centers Scheduled by Dundee Cement Co.

Officials of Dundee Cement Company have announced that construction will begin soon on two cement distribution and service centers for the Cleveland and Cincinnati, Ohio, areas. Each facility will cost approximately $400,000 and will initially have two steel silos, with a total unloading capacity of 150 t.p.h.

The Cleveland facility will be situated in the metropolitan area on the cloverleaf at the intersection of State Route 17 and U.S. Highway 21. The Cincinnati center will be located just north of the city on the main line of the Baltimore & Ohio Railroad, at Highway 747.

The Dundee Cement Company's 5,000,000-bbl. plant at Dundee, Mich., was just recently completed. (See PIT AND QUARRY, April, 1960, page 32.)

The *Rockland County*, described as the first push-type diesel towboat specifically designed for modern Hudson River requirements, was launched recently at the Wilmington, Del., shipyards of Dravo Corporation, Pittsburgh. Built for Cornell Steamboat Company, a subsidiary of New York Trap Rock Corporation, West Nyack, N. Y., the new vessel entered service in April, pushing barge tows of crushed stone from Trap Rock's five quarries along the Hudson.

South Dakota's state-owned cement plant produced a net profit of $3,778,000 in 1959—an increase of $900,000 over the previous year.

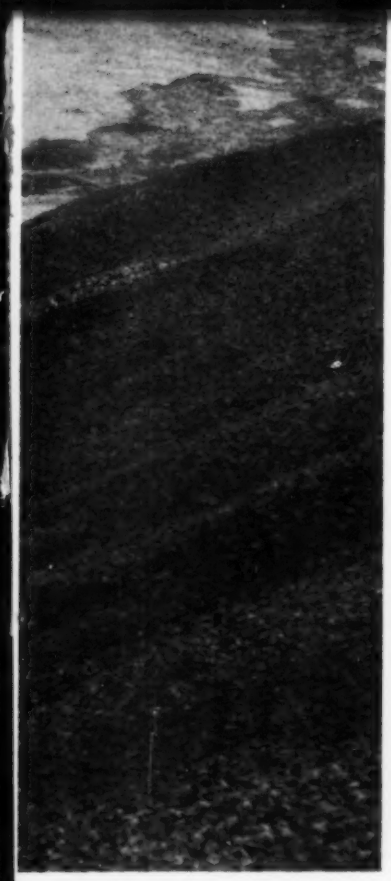
Here's typical fast Michigan Model 275A loading: two passes of 4½ yd bucket, 40 seconds heap 10 ton truck.

Model 275A bucket-loads average 4.50 yards, 5.85 tons each, per scale-measurement.

Frequent Michigan odd-job: cleanup after blasting. Unit works much faster than crawler-dozer, has added advantage of being able to bucket-lift rock higher than can blade.

Michigans move fast around the quarry, average 18 mph, often hit top of 28 mph.

Here's an unusual but profitable market for LaGace: ¼" stone for ice control. Last year, the company sold over 25,000 tons to airports and highway commissions. Like most limestones, this material contains small percentage of salt. Thus it has advantage of sticking to ice and not rolling off like sand. The result: better traction for airplanes and cars. Some of the material is stored under cover and sold dry; other customers prefer to buy from this open stockpile. The LaGace firm also makes substantial sales to the concrete industry (mostly ¾" to 1½" unwashed stone) . . . asphalt producers (200 mesh) . . . roofers (¼") . . . paving contractors (½" to 4") . . . and fertilizer plants (5 mesh).



There are, in Quebec, 27 major stone quarries. Almost all of them, 25 to be exact, do their stockpile loading with Michigan Tractor Shovels

The amazing record of one machine at one pit:

416 TRUCKS LOADED IN 8 HOURS!

Production like this certainly *helps* explain the popularity of Michigan Tractor Shovels.

But there are other reasons for this popularity—reasons which *might be of great importance in YOUR profit picture.* As a case in point, let's take ownership in Quebec, Canada.

In Quebec, over 90% of all the major rock quarries use Michigan Tractor Shovels for stockpile loading! This overwhelming preference, this record of buying and rebuying at this location, we feel, is particularly significant. For in Quebec, machines are tested by terrific extremes of *working* temperatures—40° *below* to 110° above. Tonnage demands are increasing rapidly. Distances are great and job sites are often hundreds of miles from repair and maintenance facilities.

Repeat buyer likes Michigan dependability, dealer service

One typical Quebec owner—LaGace Quarries Ltd, Montreal—exemplifies the reasons for Michigan popularity under these conditions. "Michigans usually load faster than other Tractor Shovels," says Paul LaGace. "Hence they produce more. Michigans cause less trouble, mechanically speaking. And when something does go wrong, we get excellent service from our Michigan Distributor (Blackwood-Hodge Ltd) and from Clark Equipment Company."

The LaGace firm reports from long experience. They bought one of the first Michigan Tractor Shovels sold in Canada—a 1¼ yd Model 75A—in 1954. Today, they own six Michigans: the original Model 75A, two Model 175A's equipped with 2¼ yd buckets, and three Model 275A's with 4½ yd buckets.

20 seconds per bucket load

Loading with *any* of these units from *any* of 22 crushed stone stockpiles—4" and run of crusher to lime dust—takes an average of only 20 to 25 seconds per pass, according to company time-study averages. Thus, a skilled operator and a 4½ yd Model 275A regularly heap a 25 ton hauler in five passes, under 2 minutes. A 12 ton tandem-axle truck takes a 275A two passes, 40 to 50 seconds. Top daily load count, so far, for a Model 275A has been an amazing 416 trucks, 10 to 15 tons each, in 8 hours! Production, overall, with the six Michigans loading at LaGace's two pits, has averaged 1,000 to 2,000 tons hourly—over three times as much as before Michigans.

Other jobs: loading shot rock, cleanup after blasting, etc.

The Michigans do a lot of odd jobs too. In emergencies, they have loaded quarry rock. Several of the units often handle cleanup after blasting, dozing and lifting material into high, centrally-located shovel-efficient piles. At times, they clean spillage from haul roads and crusher sites. They tow stalled vehicles. In winter, they plow snow. As Raoul Savage, quarry supt, puts it, "*Whenever we want to lift or haul anything, we just call for one of the Michigans.*"

Good advice! If you *don't have* a Michigan—or if you'd like to see the performance advantages of our *latest models*—call your Michigan Distributor for a demonstration. Pick the size you want to see—nine models, with buckets from 16 cu ft to 10 cu yds, 3,000 to 30,000 lb lift capacities.

Michigan is a registered trademark of

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Construction Machinery Division

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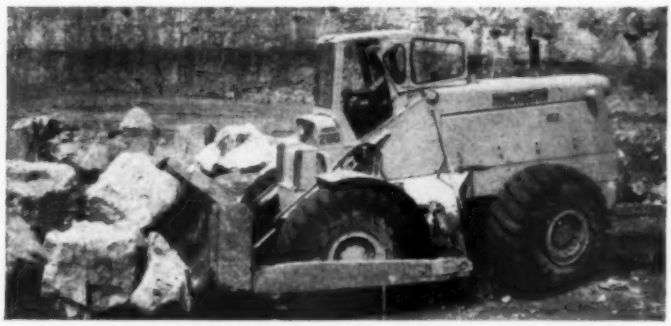
Michigan's primary job: cleaning around two 6-yd shovels, usually spotted 1,500 to 1,800 ft apart.



Typical Michigan odd-job: centrally stockpiling oversize rock chunks for secondary breakage.

To clean and pile average 40,000 ton blast takes the high-speed 56,000 lb Michigan only half a day.

Job-to-job moves are made at truck-like speed. Unit's tires roll easily over the rocky footing so abrasive to tracks.

One 262 hp Michigan Dozer does work of two big crawlers: cleans around two 6-yd rock shovels, also piles blast rock at Huron Portland Cement Company quarry.
A typical saving:

60% CUT IN SHOVEL CLEANUP TIME

At least three important savings have been realized by the Huron Portland Cement Company quarry, Alpena, Michigan, since their 262 hp Michigan Tractor Dozer took over pit maintenance duties.

ONE, the Model 280 Michigan Tractor Dozer and its one operator do the work of two 28,000 lb class crawlers and two operators.

TWO, Michigan tires have eliminated annual or bi-annual track rebuilding. Tires on the Model 280 are expected to last "about twice, maybe three times as long as tracks," say men on the job...an estimate based on the quarry's three-year experience with a smaller (162 hp) Model 180 Michigan Dozer, recently moved from the quarry to the company cement plant.

THREE, the Michigan, with its high speed and power, saves time on almost every individual cleanup chore. To be sure, this saving may be only 2 to 5 minutes per job . . . but added up over 6 days a week, 52 weeks a year, the sum total makes an important contribution in more loads delivered, quarry face to crusher grizzly.

For instance, take the saving in shovel cleanup. Back in Huron Portland's crawler days, a good operator could clean the spillage around one shovel in 5 minutes. While the crawler dozed, the 6 yd electric shovel couldn't load (primarily because its power cable blocked one side). Today, the shovel still cannot load during cleanup. But the high-speed Michigan does each cleanup in 2 minutes! Thus, 3 minutes are saved. Three minutes saved, 8 to 12 times a day, *at each of Huron-Portland's two 6-yd electric shovels.* That's 5 to 7 extra 26 to 27 ton truck loads *from each shovel* each day—260 to 360 extra tons of stone each day for the crusher (and the cement plant).

75% cut in blast cleanup time

Another example of time saved is in blast cleanup. One to four times a week, Huron-Portland's crew shoots the 100 ft high quarry face. Each blast breaks up 35,000 to 45,000 tons of limestone. Trouble is, some rock gets thrown 100 to 200 feet, sometimes 300 ft. Used to take a crawler one to two days to police the area and gather all the rock. Now, the Michigan Tractor Dozer does the policing job in half a day. (Here is one place the 262 hp Michigan Model 280 noticeably outperforms the 162 hp Michigan Model 180 used so successfully for three years. The bigger Model 280 can move heavier rock . . . can often do in two passes what took the Model 180 four passes . . . and it can pile the rock several feet higher.)

Stockpiles oversize rock . . . biggest chunk moved, 16½ tons

Being the only *mobile Dozer* in the 450 acre pit means the Michigan does lots of odd jobs too. It moves drilling machines, air compressors, and shanties. It cleans spillage from the 2,000 ft of shovel-crusher haul road. Cleans around the crusher. Drives a mile to the cement plant to stockpile coal, when necessary. Moves power cable for the shovels. In winter, it keeps roads and building areas free of snow. It even moves oversize rock chunks away from shovel for secondary breakage. Biggest rock chunk dozed by the Model 280, to date, measured 4x5x10 ft, weighed about 33,400 lbs.

Check performance on your job

We'll bet a Michigan Tractor Dozer can break production bottlenecks for you, too. Won't cost you a cent to find out—your local Michigan Distributor will be glad to arrange a thorough demonstration. You pick the time . . . the job . . . and the model Michigan Tractor Dozer (162, 262, 375, or 600 hp) you want to see. No obligation, of course.

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Another gold star was awarded PIT AND QUARRY by the National Safety Council for safety promotion during 1959. Walter E. Trauffer, editor, left, holds the star, which will be added to previous ones on the Public Interest Award plaque. James M. Christie, right, staff representative, Cement, Quarry, and Mineral Aggregates Section, N.S.C., made the presentation.

1959 N.S.C. Awards Announced *Pit and Quarry* Again Cited

Recipients of the 1959 Public Interest Award, given by the National Safety Council, were recently announced. Once again, PIT AND QUARRY was among the specialized magazines chosen to receive the annual award, presented for exceptional service to safety promotion by organizations in the mass communications field. (See illustration.)

In announcing the awards, Howard Pyle, N.S.C. president, explained that the recipients are chosen on a basis of continuous efforts in safety promotion.

The Public Interest Award was established in 1948 to honor leadership, initiative, and originality in the furtherance of accident prevention.

Alpha to Spend $50,000,000 In 6-Year Modernizing Plan

Alpha Portland Cement Company will spend an estimated $50 million during the next six years to completely modernize all of the company's eight plants.

The modernization program is intended to help Alpha meet an anticipated boom in the construction field, and competition from both domestic and foreign cement producers. Plans call for the expenditure of $6 million in 1960.

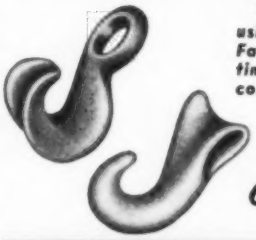
The program will be financed from depreciation and retained earnings. The company has recently completed a $26,000,000 expansion program. During 1959 capital expenditures totaled only $3,000,000, spent mainly on small improvement projects in its various plants.

British Columbia Cement Co. has deeded 68 acres of company property near Mill Bay, Vancouver Island, to be used as a beach park by British Columbia residents.

OUR *Fiftieth* YEAR

FARRELL-CHEEK

SHEAVES and Wire Rope Fittings



Cast Steel and 50 years of know-how in using it account for the superiority of Farrell-Cheek sheaves and wire rope fittings. Actual service in the field readily confirms all claims.

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IMPROVED WEDGE TYPE SOCKET

SNATCH BLOCK SOCKET

STANDARD TYPE SOCKET

Sheaves with Cable Saver Grooves and unmatched resistance to fatigue and wear * Choker Hooks of great strength and utility * Standard, Wedge Type and Snatch Block Sockets of many performance features * Clips, Thimbles and Eye Hooks . . . all electric furnace cast from Farrell-Cheek carbon and F85 alloy steels.

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Agstone, Aggregates, Legislation Covered in Iowa L.P.A. Meeting

THE 15th annual convention of the Iowa Limestone Producers Association maintained the record of concentrating discussions on important industry problems, internal business, and a yearly social gathering into an obviously full two-day program. Held at the Hotel Savery, Des Moines, the convention reflected in the large attendance the interest of the producer and manufacturer division members which make this group one of the most progressive state associations in the country.

Among the distinguished guests and scheduled speakers who are recognized authorities in their respective fields were Iowa's governor, Herschel C. Loveless; Dewey Cornell, program specialist of the state ASC committee; L. M. Clauson, chief engineer, Iowa State Highway Commission; Ted Welp, senior geologist, Iowa State Highway Commission; Dr. E. R. Duncan, extension agronomist, Iowa State College; Clyde Spry, state secretary of agriculture; and Robert M. Koch, president, National Limestone Institute.

The first day of the convention was devoted to meetings of the various standing committees for preparation of reports to the general membership. At the close of business sessions on the second day the board of directors met to elect the group's officers for 1960.

Tom L. Robinson, Missouri Valley Limestone, Oakland, was re-elected to the association's top office. Joseph A. Madlom, Madlom Brothers, Edgewood, was named to the vice-presidency. Ray Cook Jr., Ray Cook Construction Co., Ames, was re-elected to the board of directors. Two new members of the board are Robert R. Weaver, Weaver Construction Co., Iowa Falls; and Al Hewitt, Hewitt Brothers, Fredericksburg.

In an area of activity typical of those in which a state association can be most effective, the legislative committee under Herman E. Snater, chairman, cited the defeat of one objectionable bill in the state legislature, and the pigeonholing of another. The first would have imposed a 5-cent/ton tax on all limestone (and other minerals) removed from Iowa deposits. The second proposed that drilling reports, made to the Water Resources Board, should include mineral data as well as water levels. The committee urged continued opposition to the latter in the event that this bill is again brought to the floor of the legislature.

An unrelated but equally important area of potential legislative difficulty was noted by President Robinson. There has been an increasing number of reports on growing zoning problems from the association members, it was pointed out—despite the predominantly agricultural character of Iowa. This problem has actually grown to the point, it was said, requiring a committee to be named to study the situation and propose counter measures.

In a review of the ACP program and other factors in the agriculture picture. Mr. Cornell pointed out the population increase which is concurrent with a decrease in farm population. However, he noted, 40 percent of employment in this country is related to agriculture.

Some opponents of ACP aglime practices object, Mr. Cornell said, because this practice increases production; but, he said, *any* good conservation program will increase production. We cannot afford *not* to conserve the land for future generations, it was emphasized, as well as for all those who are now relying on the farmer for food.

The 1960 ACP fund allocation for Iowa is about the same as the preceding year, Mr. Cornell indicated, and there are now 23 practices involved. He noted that 29 percent of the total program allocation in 1958 was used for agstone. Weather conditions late last year and early in 1960 may have considerable effect on the amount of funds spent for agstone during this fiscal period.

Certain steps have been taken to encourage or facilitate agstone use, it was said. These include expansion of purchase order provisions and of the availability of soil testing service.

I.L.P.A. members also had the somewhat unusual experience of hearing some of their number taken to task by a long-time friend. Mr. Clauson of the highway commission emphasized that producers who have leased mineral rights within the rights-of-way of the interstate system and other routes in the road program have created a problem. Whether this was done innocently or deliberately, the effect is the same.

Such leasing, mostly under option/lease agreements, has resulted in abnormal demands for damages

Tom L. Robinson, left, Missouri Valley Limestone, was re-elected to the presidency of I.L.P.A. Joseph A. Madlom, Madlom Brothers, is the new vice-president.

Dewey Cornell, left, program specialist, ASC, with Robert L. Miller, assistant executive secretary of I.L.P.A.

L. M. Clauson, chief engineer of the Iowa state highway commission, pointed out some right-of-way problems.

by landowners, who seek amounts from the commission equivalent to royalty returns from producers. This creates land market prices out of all proportion to normal markets in a given area, Mr. Clauson stated, and obviously boosts road construction costs.

This problem must be worked out between industry producers and the highway commission, or the latter may be forced to extremes in condemnation procedures. Commission attorneys will extend every cooperation to the producers in this area, Mr. Clauson emphasized.

Mr. Welp, senior geologist for the highway commission, presented some interesting geological aspects of material supply for the road program in the state. Increasing demand on known source locations of durable aggregates led to a study of potential sources on a state-wide basis. In 1958, Mr. Welp's organization began to develop a map showing the distribution and quality of material in existing and possible operating sites.

In Iowa, the strata dip to the southwest, and most of the quarries are found in the northeast third of the state. Crushed stone can be produced in the other areas, but the formations from which raw material would be obtained are relatively deep. There are no quarries in the northwest, Mr. Welp said, since Cretaceous sediments predominate.

Due to an unfortunate illness, the association's popular executive secretary, Clint Allen, was unable to participate in this convention. The members expressed their feeling by taking a step toward alleviating the tedium of his current hospitalization through the gift of a portable TV set. Anyone wishing to contact him by letter or card may do so by writing him at the Veteran's Hospital, Des Moines.

Since the onset of Mr. Allen's illness, he has been capably represented by the association's new assistant executive secretary, Robert L. Miller, whose efforts contributed significantly to the success of the recent convention.

Note: Since the preparation of this report, we have been advised that Mr. Allen passed away. His unfortunate death is reported in the news pages of this issue.

Harry Ellsberg, chief structural engineer of Giffels & Rosetti, Detroit architects and engineers, was named winner of the 1959 concrete achievement award sponsored by the Huron portland Cement Company for the Concrete Improvement Board of Greater Detroit.

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HIGH PRODUCTION
DYNAPACTOR !
MFG. EXCLUSIVELY BY ROGERS IRON WORKS CO.
ORDER NOW for early delivery
ROGERS DYNAPACTOR'S specially-designed lower chamber permits any large piece passing feed opening to be crushed without bridging. Handles feeds containing a large proportion of mud. Maintenance is greatly reduced by simplified single rotor design. Capacities from 250 to 1200 tons per hour. Available as portable, semi-portable or stationary units; in 38"x 50", 46"x 54" and 56"x 60" feed opening sizes.
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Enter 41 on card, page 233

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WHICH

There's a lot of easy digging in this low-lying, well shot pile. A minimum of secondary blasting is needed, and there's no towering muck pile to come showering down on your men or equipment. Breakage and displacement like this gets every possible hour of service out of all your equipment.

Effective blasting control doesn't just happen. There is a combination of explosives and blasting methods that is right for every shot. For instance, if the conditions in your quarry lend themselves to the use of AN blasting agents, *new* Atlas Pellets are porous, compact particles that have higher density and sensitivity for more efficient blasting. On the other hand, for some rock formations, high explosives often do a better job—and more economically. In addition, all types of blasting caps, primers, and special packaging methods are available from Atlas . . . each designed for certain conditions and types of work.

Which Explosive? That's the job of your Atlas Representative. Backed by the complete Atlas line (including all types of ammonium nitrate), his experience with the latest advances in explosives and techniques can help you find the explosives combination and the particular blasting methods that will be most profitable for you on every shot. Our blasting cost chart, slide rules and technical literature are designed to help you determine your lowest true blasting costs. Ask your Atlas Representative about them—or write directly to:

ATLAS POWDER COMPANY
Explosives Division, Wilmington 99, Del.

When you use the right combination,
all your equipment
moves in sooner...
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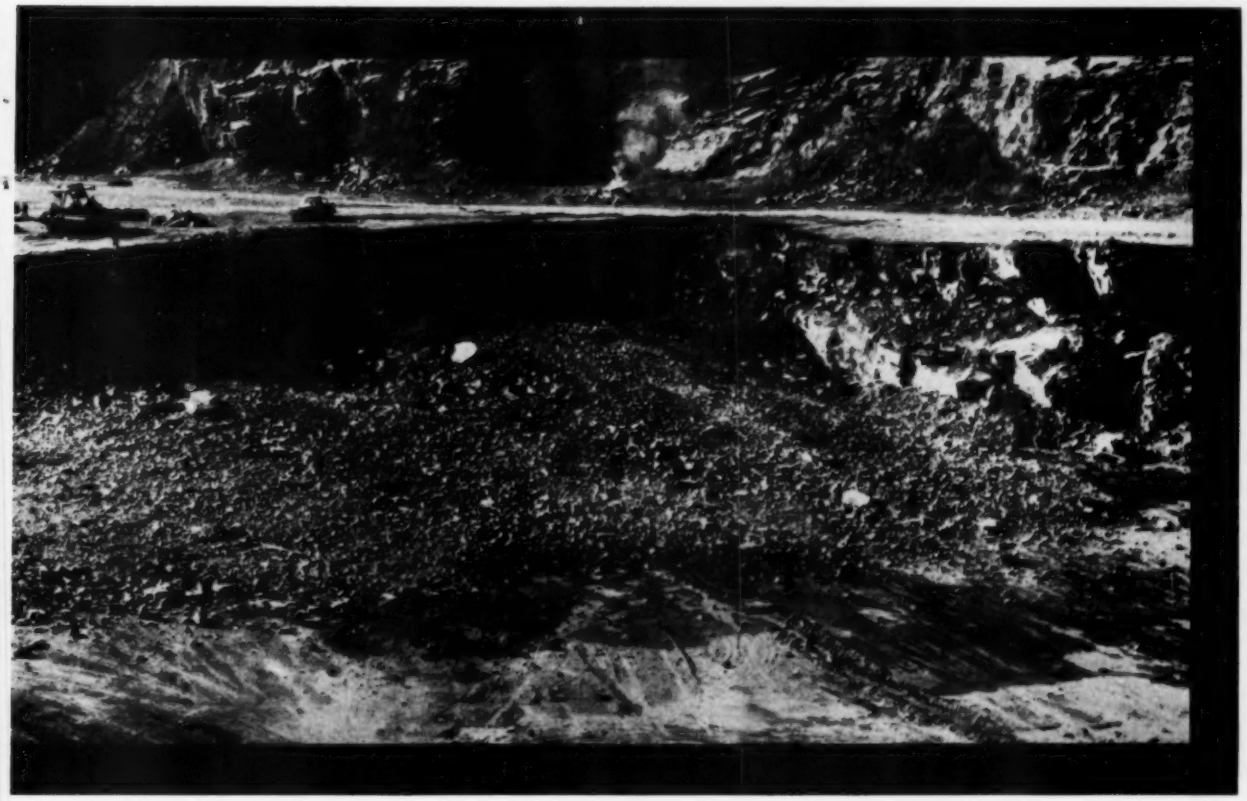
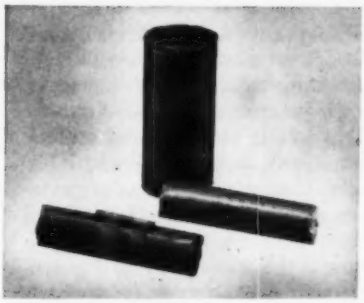
ATLAS PELLETS, a new form of ammonium nitrate, are porous, compact particles that have both the density and sensitivity required for efficient ammonium nitrate blasting.

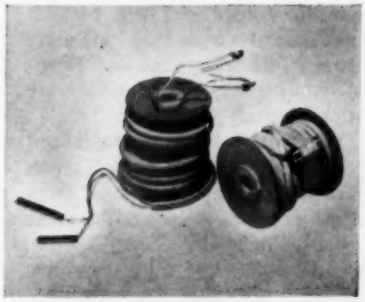
EXPLOSIVE?



GIANITE, a pre-mixed form of ammonium nitrate, provides the flexibility needed to use ammonium nitrate blasting agents where on-site mixing is difficult or impractical.



GIANT "75" PRIMERS have the wallop required for complete, efficient detonation of both field mixed and plant mixed AN blasting agents, even under severe conditions.



TWINPLEX BLASTING CAPS are two E. B. caps with the leg wires enclosed in a plastic sheath—for detonation at the bottom of deep blast holes, the point of maximum confinement.

ATLAS EXPLOSIVES

Subterranean storage facility at the Atchison (Kans.) Ordnance Storage Facility (a worked-out limestone mine), is used to store and rehabilitate machine tools, which are protected by complete temperature and humidity control. Operating personnel are protected against exhaust fume hazards from fork-lift trucks by catalytic exhaust purifiers.

Truck Fume Hazards Ended In Kansas Tool Storage Mine

The old Kerford Quarry Company limestone mine at Atchison, Kans., once used by the Department of Agriculture for refrigerated food storage, is still serving the nation. In 1952 the mine was taken over by the United States Ordnance Corps for storage and rehabilitation of machine tools brought in from de-activated war plants across the country.

The 65-acre underground storage facility now houses several million dollars' worth of machine tools, which are protected by means of complete temperature and humidity control.

To protect the 150 persons working in the storage area from exhaust fume hazards from the gasoline-powered fork-lift trucks and sleepers, catalytic exhaust purifiers are installed on all vehicles.

Protection against accumulations of dangerous or irritating carbon monoxide or hydrocarbons from vehicle exhausts is assured by these purifiers, made by Oxy - Catalyst, Inc., Berwyn, Pa. The purifiers effectively eliminate 95 percent of exhaust contaminants and convert them into harmless carbon monoxide and water vapor.

These purifiers are mounted on 12 units: ten fork-lift trucks and two sweepers. In operation, hot exhaust gases are streamed through nests of catalyst-coated porcelain rods in the purifiers. This promotes an oxidization reaction which consumes incompletely burned contaminants at relatively low temperatures. Average life of a purifier is 3,000 hours.

The Atchison Ordnance Storage Facility is contract-operated by Page Airways, Inc., Rochester, N. Y.

Washington News Letter

(*Continued from page* 11)

ments, but, rather, on those figures corrected for the price increase. Consequently the results reflect, essentially, the physical volume of business investments.

When the figures are broken down somewhat, it is noted that optimism appears to be rather universal throughout most industries. In manufacturing industries, substantial increases in investment expenditure are expected in metal manufacturing, particularly in steel mills and fabricating plants (where some of the increase is due to deferred investments which were not made last year because of the extended strike); in nonferrous metal products, particularly aluminum; in electrical and rubber manufacturing; and in stone, clay, and glass.

An especially surprising fact is that after some years of lagging, the transportation industries, including railroads, are planning on investment expansion. With respect to commercial construction, retailers' plans for 1960 show a continuing rise. In large part, this is due to the continuing development of new shopping centers.

The history of these surveys of expected capital investment has indicated that in their rising phase actual expenditures, when finally added up, generally exceed expectations. Thus, if the past pattern is followed, 1960 is likely to be not only as good as 1957, but probably a good deal better.

Politically, this rosy picture is expected to be the principal factor which will deliver Richard Nixon to the White House. It is also hoped by the same people that the optimism will provide a Republican Congress for the first time in many years. The political realists, however, do not expect any such sweep. They are beginning to question whether such economics alone can be relied on heavily. For this reason social welfare and civil rights measures are being fought over so bitterly. In this coming national election, they are expected to play as significant a role as the more bread-and-butter issues.

Labor Developments

(*Continued from page* 13)

countries unemployment is calculated somewhat differently from the way it is reckoned in the United States. As a result, many of the young people and women who in the United States are calculated as unemployed would not be so reported in the statistics of England, for example.

Second, they point out that the unemployment habits of Europeans are somewhat different from those of workers in the United States. For example, there is not nearly so much coming and going in the labor market among women and young people in European countries. Nor is there as much job changing in those countries. Consequently, there is less between-jobs unemployment. Employed people are generally attached to particular jobs. The minority members point out: "In the United States we regard this mobility as a very important aspect of freedom of choice and a very valuable asset in making more effective use of the labor force and in keeping our productivity high. (*Turn to page* 46.)

TDM Self-Propelled Carrier has U-Bar construction which permits drilling true vertical holes on rugged terrain. Wide crawler pads and long ground contact give exceptional stability.

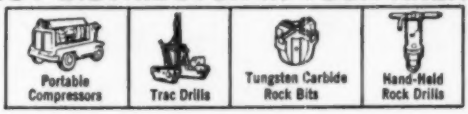
THE JOY 450 DUAL ROTATION DRILL

The new Joy 450 Dual Rotation Drill mounted on the sturdy Joy TDM self-propelled carrier is the modern way to mass produce blast holes economically. The 450-DR drill is the newest and fastest thing in percussion drills. A powerful air motor, geared to the chuck, gives hammer-free rotation for steel changing, and assists rifle bar rotation when the drilling gets tough. It can bottom holes that other drills can't finish—and save you money.

U-Bar feed mounting on the TDM carrier provides the most stable arrangement possible for productive drilling, and is versatile enough to drill holes at practically any angle. Fast tramming and instant response to the completely automatic controls enable the TDM to move quickly, and set up fast.

Among 4½" bore machines, the TDM mounted 450-DR drill is unbeatable in speed, power, and maneuverability. Competitive tests have proven it. For complete information, write for Bulletin 1018-26.

JOY CONSTRUCTION EQUIPMENT IS SOLD AND SERVICED BY THE JOY DISTRIBUTOR IN YOUR AREA



JOY

Joy Manufacturing Company
Oliver Building, Pittsburgh 22, Pa.

In Canada: Joy Manufacturing Company (Canada) Limited, Galt, Ontario

Labor Developments

(*Continued from page 44*)

"In many European countries," they continue, "it is almost impossible for an employer to lay off a worker, even when production is reduced, sometimes by law, sometimes by custom. The burden of proof is on the employer. This is true, for example, in France, Italy, and West Germany. In Germany the law covering protection against dismissal, August, 1951, regulates any layoff (of ten or more workers) and provides that individual workers can be terminated only for 'socially justified' reasons. Thus, when production falls, productivity falls, costs rise, prices rise."

And then the minority goes on to ask, "Is this the kind of policy the majority would have us follow?"

In this last matter the Republican minority appeared to have its strongest and most valid position of difference with the Democratic majority. But even here the quarrel is over statistical details, not matters of broad general policy.

Both groups appear to be impressed with the problem of long-range, chronic unemployment. Both appear to be concerned about the fact that at the end of each of the three post-World War II economic recessions, the nation was left with a higher proportion of chronically unemployed workers than before. And the ratio seems to be rising.

Both majority and minority members show real concern about the question of whether there will be enough jobs to take care of the increasing proportion of new young people coming into the labor market. Both apparently are concerned about the job opportunities available for minority groups, older workers, and handicapped workers. Both recommended a large number of governmental programs.

It may be of interest that the recommendations of the Republican minority outnumber those of the Democratic majority by more than five to one. These recommendations include aiding distress areas through area redevelopment legislation; expanding the activities of the Small Business Administration; directing federal procurement to aid distressed areas; developing a large number of programs to redirect workers from surplus areas to other places where they are needed; setting up a substantial program for providing job opportunities for minorities, including legislation to establish a Commission on Equal Job Opportunities under Government Contract and many changes in the unemployment insurance and public assistance programs.

Indeed, the essential similarity of position between these two groups, who act as if they are opposed to each other, is the most convincing demonstration that elected officials, at least, have come to the firm conclusion that a high level of unemployment will never again be tolerated in the United States.

It is particularly significant that a 5 percent national average has come to be regarded as the outside figure that will be tolerated by the electorate. A figure higher than 12 percent, even if it is limited to specific areas, is the maximum that is politically safe to admit.

Tailor-made to give you more efficient blasting! **BEMIS EXPLOSIVES BAGS**

Bemis Explosives Bags for ammonium nitrate and nitro-carbo-nitrate explosives are tailor-made to your requirements — to give you more efficient blasting.

More economical: Use of Bemis Explosives Bags and ammonium nitrate mixtures can save up to 50 percent on explosives costs.

Easy to fill: Bemis provides technical assistance, manufactures equipment to speed up bag filling.

Wet hole or dry hole . . . here are just a few of the Bemis Explosives Bag constructions in use:

Burlap bag with heavy-duty polyethylene liner. The rugged burlap absorbs the punishment of handling or jagged holes. Poly liner provides waterproofness.

Flexiply® bag with poly liner. Here three plies of rugged creped wet-strength kraft provide the toughness.

Laminated bags. Constructions of burlap, kraft paper, polyethylene and pliofilm — in varied combinations — are all performing satisfactorily in the pits and on construction sites.

Write today for sample bags and additional information on Bemis Explosives Bags.

Bemis

Where flexible packaging ideas are born

General Offices—408-Y Pine St., St. Louis 2

Enter 46 on card, page 233

B.F.Goodrich develops 2 new long-wear tire compounds

B.F.Goodrich Cut Protected and Heat Resistant compounds boost tire life, cut costs on heavy construction and earth-moving jobs

THE most costly tire-killers on construction projects are either rock cuts or heat build-up. A B.F.Goodrich research team went to work on the problem, tested and researched various compounds, then developed the first truly Cut Protected and Heat Resistant compounds on the market.

Cut Protected compound gives longer service on jobs where:
- Rock cutting, chipping and abrasive wear are severe.
- Round-trip hauls are short.
- Trucks travel at low speeds.

Heat Resistant compound defies heat build-up on jobs where:
- Haul roads are well maintained.
- Trucks travel at high speeds.
- Cutting and chipping are at a minimum.

Tests show these compounds outperform any others available today. Ask your B.F.Goodrich dealer about them—find out how they can save *you* money.

HERE'S UNRETOUCHED PROOF of how the new B.F.Goodrich Cut Protected compound wears longer. Both tires were in service at the same time on identical jobs under identical conditions. Yet the Cut Protected compound tire above has given *approximately 3 times more service* than the tire below. Note how little the Cut Protected tread is worn.

SCRAPER HAULS 35 TONS OF CLAY AND SAND to grade new Interstate Highway No. 1202-(1)-9 in Conecuh County, Ala. Equipment works 60 hours a week on stop-and-go runs of a mile or less. Here's a job for the new B.F.Goodrich Cut Protected compound. On long, high-speed hauls, you'd choose the new Heat Resistant compound.

More highway construction news from B.F.Goodrich

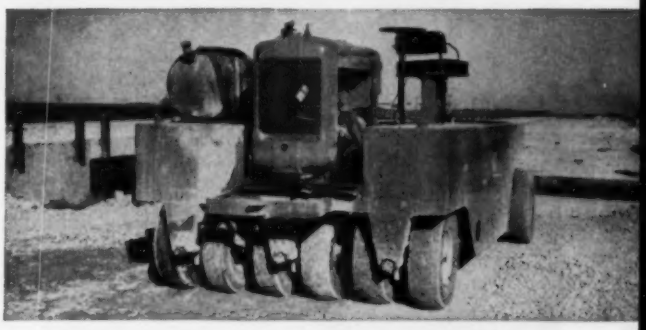
RUSHING HIGHWAY CONSTRUCTION near Lackland Field, this giant Killian-House scraper is loaded with 30 tons of earth. Tires are B.F.Goodrich Rock Service Tubeless, designed with massive double-chevron cleats for extra traction, forward or reverse. Rock Service tires are available in the new Cut Protected compound that defies rock cuts and snags, in the new Heat Resistant compound that withstands dangerous heat build-up, or in the Regular compound for normal service.

How long-wear B.F.Goodrich tires

HYDRAULIC DUMP TRUCK deposits asphalt to pave highway 25 miles southwest of San Antonio. Front tandem tires are B.F.Goodrich Power Express. Rear tandems are Traction Express on 4th retread. B.F.Goodrich FLEX-RITE NYLON cords withstand double the impact of ordinary materials, resist heat blowouts and flex breaks. That's one reason why Traction Express tires can be retreaded again and again.

B.F.GOODRICH ON-THE-JOB SERVICE helps contractors cut costs to a minimum. Servicemobile is equipped with all the latest power tools, including hydraulic cranes, bead jacks and pneumatic wrenches. B.F.Goodrich Tire Service Men handle any type tire on any type equipment, work quickly and efficiently. Best of all, B.F.Goodrich Tire Service Men are there when you need them.

6,000-GALLON WATERWAGON rolls on B.F.Goodrich Earth Mover tires. Note the unusual "button" tread. Hundreds of sharp edges bite into the ground to keep the tire from skidding or slipping. Yet the Earth Mover's wide tread keeps the tire on top of soft soil. Work stays on schedule.



HELPING COMPACT EARTH is the job of the 13 B.F.Goodrich smooth-tread tires on this road roller. Other Killian-House equipment includes 30 flat bed and water trucks, 10 scrapers, 15 maintainers, 30 pickups and 30 hydraulic dump trucks—all on B.F.Goodrich tires.

KILLIAN-HOUSE RELIES on B.F.Goodrich truck and trailer tires to move 200 amp. welding machine to equipment repair jobs. Altogether, this contractor uses nearly 800 B.F.Goodrich tires to help speed highway construction in Southwest Texas.

B.F.Goodrich Smileage!

keep highway construction on the go

KILLIAN-HOUSE, one of the biggest highway and bridge construction companies in Texas, operates out of headquarters in San Antonio—maintains three field offices with 2-way radio hook-up to help service jobs currently worth more than twelve million dollars.

Every day a fleet of 143 units goes to work on B.F.Goodrich tires—scrapers on Rock Service tires, dump trucks on the Traction Express, maintainers on Power Grader tires, water trailers on Super Traction tires, pickups on the Power Express—even company cars on B.F.Goodrich Life-Saver Tubeless tires.

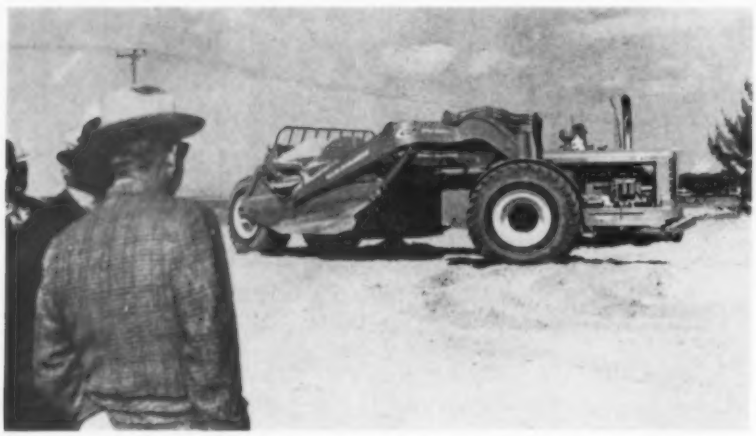
Why this vote of confidence in B.F.Goodrich? "Because," says General Superintendent Glen Quick, "they are the best tires for the job. For example, we once got only 30,000 to 50,000 miles from truck tires. Costs were enormous. Now B.F.Goodrich Traction Express tires give us 60,000 to 90,000 miles, cutting our costs in half."

Why not have a talk with your B.F.Goodrich Smileage dealer. He has long-wear tires for every type of off-the-road work and tire service that keeps construction on the go. Look under Tires in the Yellow Pages of your phone book. *The B.F.Goodrich Company, Akron 18, Ohio.*

SPECIFY B.F.Goodrich Tubeless or tube-type tires when ordering new equipment

OFF-THE-ROAD TIRES BY B.F.Goodrich

new machinery



● The new, all-hydraulic, 30-cu. yd. TS-360 motor scraper was introduced to 1,600 earth-moving contractors and Allis-Chalmers construction dealers at "Sunshine Premieres," held by Allis-Chalmers Manufacturing Co. in California and Florida in February and March. **352**

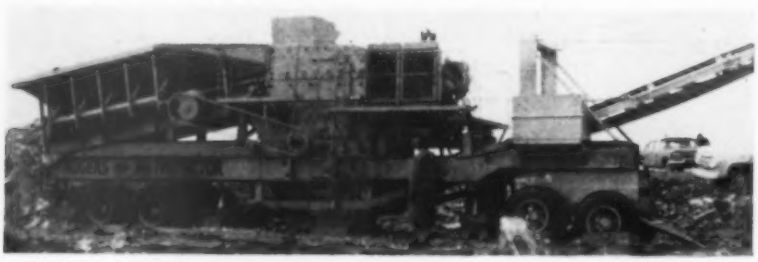
● Hard-surfacing wires for submerged-arc automatic application are a new line now available from the Hard Surfacing Division of Alloy Rods Company.

The "Wear-O-Matic" fabricated wires are precision cold-drawn to a tolerance of ±0.003 in. This compresses the filler material to a near solid. The result is a weld deposit of uniform chemical and physical properties.

Six alloys are produced in 1/8-, 5/32-, and 3/16 diameters. One hundred pound, layer-wound coils are covered with vapor-producing, corrosion-barrier paper, spiral-wrapped with heavy asphalt-laminated paper, and enclosed in a wax-lined cardboard case. **(353)**

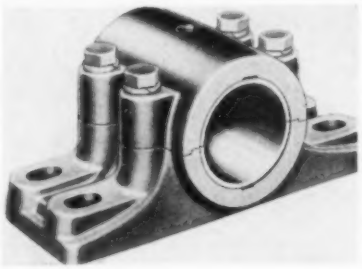
● Single-rotor impact crushers are available from Rogers Iron Works Company in 38x50, 46x54, and 56x 60 feed openings.

The units have a lower chamber so designed that any large piece passing the feed opening can be crushed without bridging. The crusher is also able to handle feeds containing a large proportion of mud, without clogging. Capacities range from 250 to 1200 t.p.h. These crushers are available as portable, semi-portable, or stationary units. **(354)**



● Bronze precision liners, reportedly, can be replaced quickly and easily in pillow blocks of a new design, announced by Dodge Manufacturing Corporation.

The sleeve bearings were developed for applications where shock loads, elevated temperatures, and corrosive conditions are anticipated. The blocks will withstand relatively high shaft speeds, shock, and pressure. A worn bushing, or liner, can be replaced without removing the bottom half of the housing from its support. **(355)**



● A newly developed line of monofilament and multifilament filter fabrics wove from polypropylene fiber is now available from Technical Fabricators, Incorporated, 136 Washington Avenue. Polypropylene is said to exhibit a wide range of chemical resistance to acids, alkalies, oxidizers, and solvents—except a few chlorinated aromatics at elevated temperatures.

It can be applied under hot (up to 275 deg. F.) abrasive conditions.

Because of its inherent slickness it remedies cake release problems on plate and frame presses, rotary drum, and pressure-leaf filters.

The new fabric also minimizes blinding, cuts cleaning time, and allows for multiproduct use without cloth changing. Fabric weaves from very open meshes to extremely tight types, are available in the form of fabricated elements or as yard goods. Costs are generally lower than comparable synthetic constructions. **(356)**

and equipment

for further information use card on page 233

● A new, multipurpose lubricant for heavy-duty motive equipment has been announced by Shell Oil Company.

Shell Darina® Grease AX, designed to lubricate heavy-duty motive equipment under adverse and extreme climatic conditions, is based on a new water-proof Microgel thickener.

In field tests Shell found fleet mileages above one million; on chassis parts mileages, more than 30 million; on wheel-bearing mileage, close to 17 million. Good service characteristics were shown by the lubricant in wheel bearings, shackles, kingpins, steering linkages, and other chassis parts. Wet stability, mechanical stability, and corrosion protection characteristics proved good in both field and laboratory tests. (357)

● Accurate cut-off control of scale loading is provided by a new "Magnetic Reed" cut-off system, manufactured by the Howe Scale Company. Designed for use with Howe "Tape-Drive" scales, this system reduces maintenance.

Available for single or multiple ingredient control, the new Howe system consists of a magnet, reed switch, and relay.

Operating as a single unit system, the pointer holding the reed switch is set to the point at which cut-off is desired. Scale loading is then started. As the load increases, the dial indicator travels up the scale until the magnet is opposite the switch. Magnetism causes the reed to make contact and energize the relay. Relay action stops the flow, and cut-off is achieved.

The operating cycle of the Howe magnetic reed cut-off system can be terminated by a manually operated dump valve, or the complete cycle can be made automatic for continuous operation. (358)

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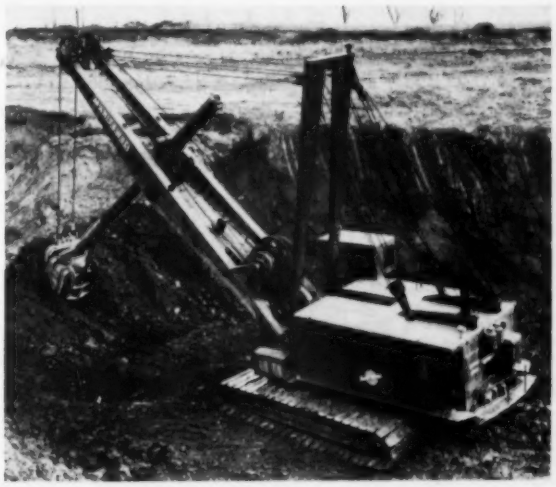
● The Model 123 front-end loader is the newest addition by The Eimco Corporation to its 103 series of crawler-tractors.

The sand and gravel bucket capacity has an SAE rating of 2¼ cu. yd., the rock bucket, 2-cu. yd. (2¼ cu. yd. heaped).

Power is transmitted through "Unidrive" transmission, and "Quadra-Torque," providing four speeds in both forward and reverse, flip-of-the-lever gear and direction changes, and a speed range from zero to 6.5 m.p.h. A "single-stick" controls all actions of the arms and bucket. Dual final drives deliver power independently to each track. (359)

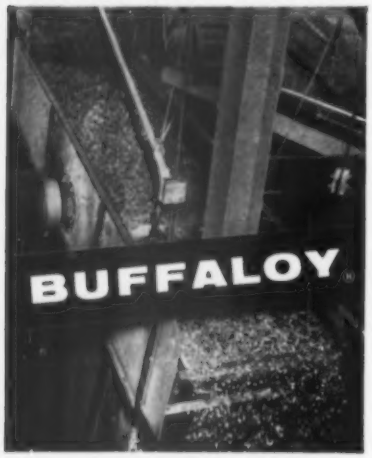


● The new Manitowoc Model 4500 VICON, recently introduced by The Manitowoc Company, is a 6- to 7-cu. yd. shovel or dragline with new concepts of excavator design and performance.

Each clutch control lever in the pilot house is also a throttle. Because the first 10 degrees of control lever movement does not activate the throttle, there is no slippage when clutches are engaged. As a result, clutch engagement is effected at low engine r.p.m., and almost zero clutch and drum r.p.m.

One torque-converter-equipped diesel engine provides power for swing, travel, and boom hoist functions only; a second, larger diesel engine, with torque converter, powers the drums. Using two independent engines is said to result in faster operating cycles, reduced maintenance costs, and far greater output on both shovel and dragline operations. (360)

LONGEST SERVICE AT LOWEST COST PER TON



anti-abrasive wire cloth

Here's the toughest mineral aggregate screen in the business . . . outperforming and outlasting screens that cost appreciably more. Specially processed for greatest resistance to wear, Buffaloy has both the hardness to hold up under severe abrasives and the flexibility to shrug off heavy shock loads.

Count on Buffaloy for many extra hours of service and substantial savings in your screening operations. Vastly superior to other high carbon wire screens, it is made in two grades:

Regular . . . for average conditions.

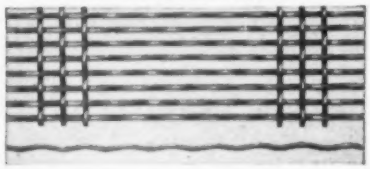
Super . . . . for highly abrasive materials.

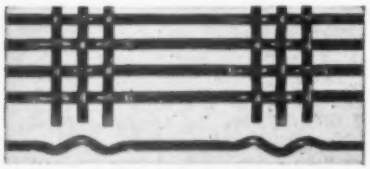
Now available in an extra wide selection of weaves, mesh sizes and gauges — either as flat pieces or vibrator screen panels with special edges — Buffaloy can answer your every sizing need.

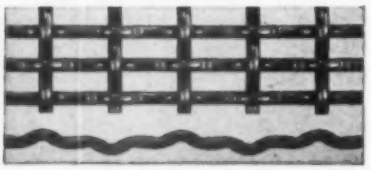
Get the complete story on Buffaloy and what it can do for you. Write for New Bulletin 600P.

BUFFALO WIRE WORKS COMPANY, INC.

526 Terrace, Buffalo 2, N. Y.







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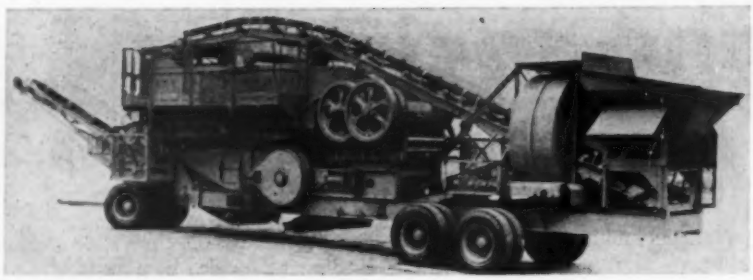


● Universal Engineering Corporation has combined a number of its units to make the new "Gravelmaster," a portable plant with a capacity of 400 t.p.h.

The units include the 13x36 matched-jaw primary crusher, a 30x 36 roll crusher, the 3-deck Screenmaster screen with its combination of air springs and rubber-bushed phasing bars, and 36-in. wide conveyors on feed and delivery. Optional equipment includes swivel-feed conveyors, plant-mounted hoppers, plate feeders, and portable conveyors.

The Gravelmaster is mounted on a gooseneck frame, with running gear. It is completely portable, and meets the load limitations of most states. **(361)**

● Harbison-Walker Refractories Company has designed a trefoil refractory heat exchanger for rotary limestone and lime sludge kilns.

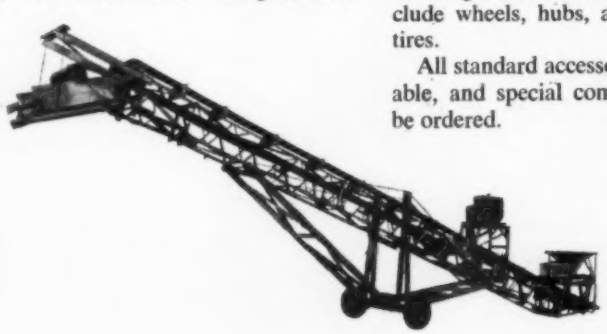
The preheated charge, passing through the trefoil, tends to moderate the temperature in the hottest zone. Accordingly, the development of excessive accretions in high-temperature zones with certain fuels may be reduced, and consequently lining life is extended. Other benefits include fuel savings and increased production in kilns. **(362)**

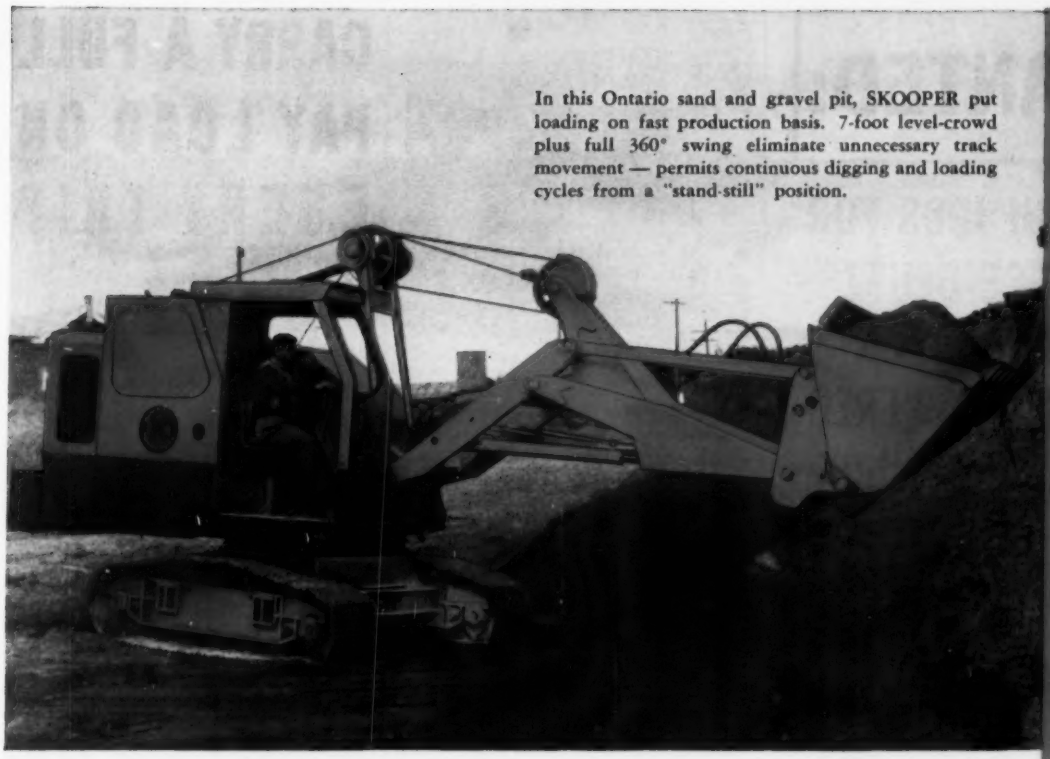
● The Bonded Scale and Machine Company is offering 18 models of a new heavy-duty, mobile conveyor with capacities to 360 t.p.h.

Available with the conveyors are vibrating screens and feeds operating from a single power unit. Standard lengths are 30, 40, 50, and 60 ft.; standard belt widths are 18, 24, and 30 in. Intermediate lengths and widths are available. Discharge heights are up to 22½ ft. Hydraulic lift raises the largest model in about three minutes. The conveyor boom will not fall in the event of power failure. Belting is 4-ply, 28-oz. duck.

These units can be made with mast or mastless undercarriage; gasoline, diesel, or electric power; and swivel or straight-line assemblies, which include wheels, hubs, and pneumatic tires.

All standard accessories are available, and special combinations can be ordered. **(363)**





In this Ontario sand and gravel pit, SKOOPER put loading on fast production basis. 7-foot level-crowd plus full 360° swing eliminate unnecessary track movement — permits continuous digging and loading cycles from a "stand-still" position.

KOEHRING SKOOPER

There's nothing like it—on wheels or Tracks!

SKOOPER combines big bucket capacity of front-end loaders . . . with the fast, smooth swing of an excavator turntable

Now you can do big bucket digging and loading *without* the usual drive-in back-out waste motion of tractor front-end loaders . . . *without* the high track or tire maintenance of a skid-turn operation. Follow Koehring SKOOPER through a typical dig-swing-dump-return cycle . . . check its *economy of motion:*

Powerful action of twin hydraulic rams crowds the 2-yard bucket along a smooth 7-foot level clean-up from "stand-still" position . . . or cuts any angle of bank slope. Next, SKOOPER swings . . . dumps load fast, clean from roll-over bucket . . . then swings back, starts next cycle . . . all *without traveling.* Or . . . at any time, SKOOPER can swing and travel simultaneously. Work with crawlers parallel to cut, or headed into bank. Has 3 types of interchangeable buckets (rock, re-handling, general purpose).

See for yourself

Check this revolutionary SKOOPER in action. Stop-watch its fast cycle time . . . see for yourself how many tons it moves per hour with only 64 H.P.! Also check its low maintenance cost, and unique advantage of excavator-crane convertibility. Call Koehring® distributor, or write.

Mail to: **KOEHRING DIVISION**
3026 W. Concordia, Milwaukee 16, Wis.

Send: ☐ bulletin ☐ specification sheet on SKOOPER

Name .....

Title .....

Company .....

Street .....

City, State .....

K57 PQ

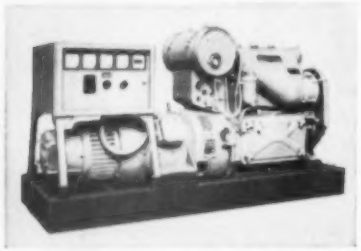
KOEHRING HEAVY DUTY

A Division of Koehring Co.

WANTED:

TOUGH JOBS FOR THESE DEUTZ AIR-COOLED DIESEL-POWERED COMPRESSORS AND GENERATORS!

Compressor with Deutz Air-Cooled Diesel A 8 L 614
No matter where your job site is, in the mountains of New Mexico or in upper Minnesota, a Deutz Diesel Powered Compressor will work to full capacity, with minimum attendance providing all the air for the job on hand. Wide range of applications in the construction and related fields exists for the full line of Deutz engines. Thousands of units in use all over the globe.



Generator set with Air-Cooled Deutz Diesel A 3L 514
Air-cooling makes the big difference with Deutz Generator sets. They work day and night, are indifferent to temperature changes or atmospheric conditions, require little maintenance and are low in fuel consumption. Range 2-12 cylinders . . . 5 to 250 BHP. Base mounted or portable.

For further information send coupon.

DEUTZ

DIESEL ENERGY CORP.
82 Beaver St.,
New York 5, N. Y. PQ-1

Please mail me your literature on your Air-Cooled Diesels.

☐ Industrial Use ☐ Construction Use

Name .....

Address .....

City .....Zone.....State.....

Enter 54-A on card, page 233

● The series B models of the H-70 and H-90 "Payloader" tractor-shovels made by The Frank Hough Company offer improvements which increase production and performance of these 4-wheel drive units.

While the operating capacity of the H-90 series B unit (shown) remains at 9,000 lb., the peak lift has been increased to 18,000 lb. Additional power is provided by a new Cummins turbo-charged diesel engine, which develops 162 hp. at 2,-100 r.p.m. A GMC diesel which develops 153 hp. at 2,200 r.p.m. is optional. The standard tire size has been increased to 18:00 x 25 to ensure additional traction and flotation. The front axle, main frame, and other structural parts have been strengthened to meet the greater work potential now possible. Air brakes are standard.

On both the H-90 and H-70 series B units the dual foot brake pedals give the operator a choice of braking with or without engaging the transmission.

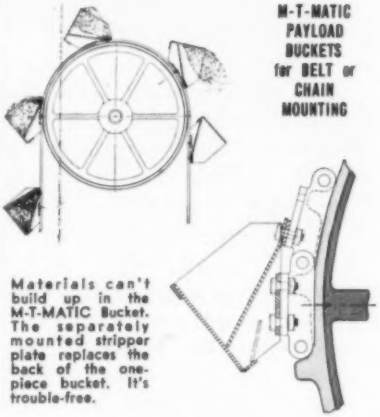
The H-70 series B Payloader retains operating capacity of 7,000 lb., but the peak lift has been increased to 13,000 lb. Improvements in the boom arm design and bucket control linkage provided additional digging power, especially for below grade work. The larger Cummins diesel develops 124 hp. Optional power includes an IHC gas engine and a GMC diesel. **(364)**

● Aluminum ferrules for clamping together loops of heavy wire rope used in lifting raw materials, machinery, crates, and even freight cars, are special extrusions produced by Reynolds Metals Company in eight standard shapes and sizes.

Since aluminum ferrules reportedly have greater ductility than those of steel, application of tremendous pressures is possible to obtain a tighter, unyielding grip without the use of heat. Under pressure, the alu-

CARRY A FULL PAY LOAD ON EVERY TRIP

M-T-MATIC Buckets are the NEWEST in self-cleaning elevator-conveyor buckets. They give you savings in time and labor costs by delivering a full payload in SAND . . . GRAVEL . . . CLAY . . . or any other sticky granular material.



Materials can't build up in the M-T-MATIC Bucket. The separately mounted stripper plate replaces the back of the one-piece bucket. It's trouble-free.

WRITE TODAY FOR PRICES.
Give your bucket size.

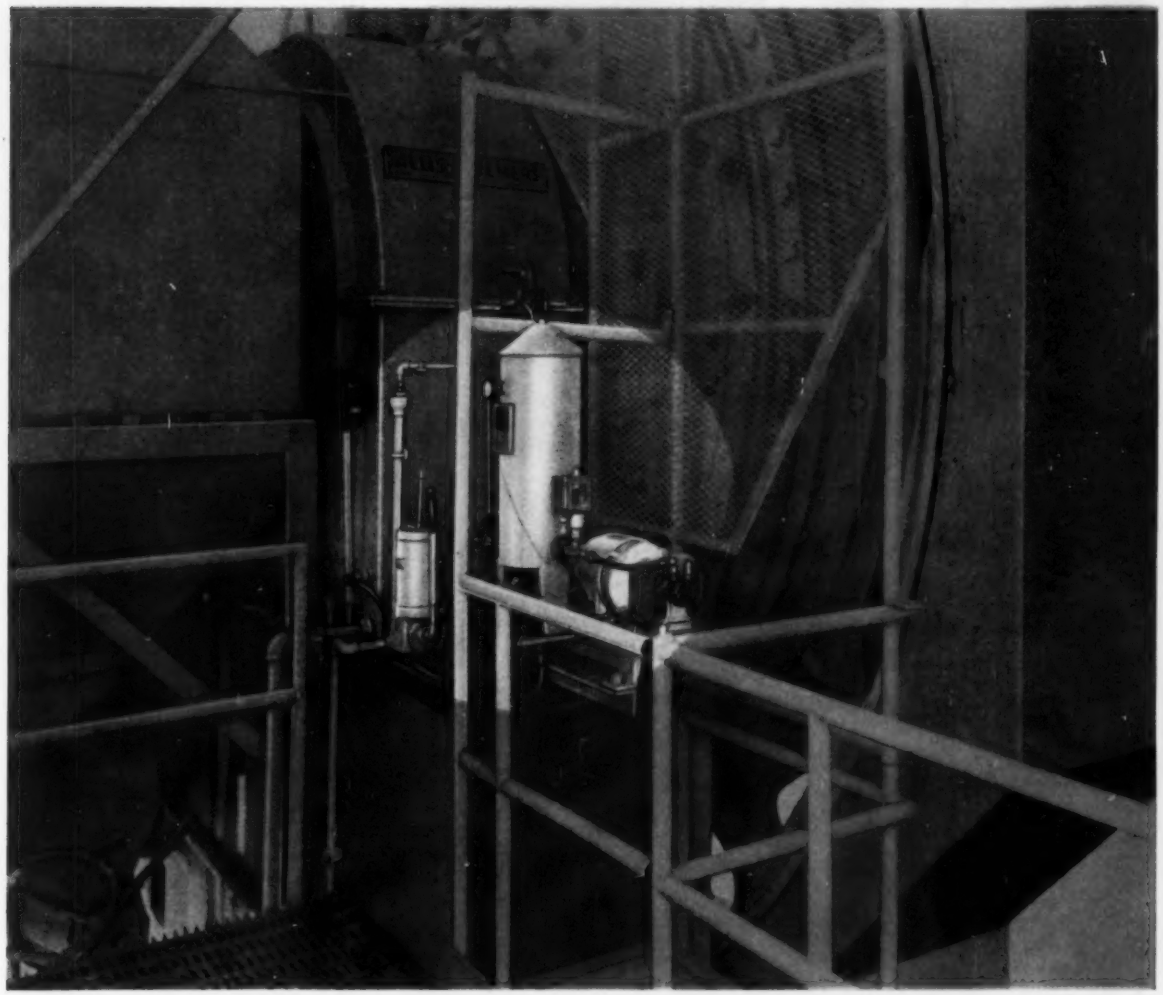
PEKAY MACHINE & ENGINEERING CO.

865 N. SANGAMON STREET
Chicago 22, Illinois

Enter 54-B on card, page 233

ALLIS-CHALMERS

A-1269



Floating start, ride and stop for big mills

New Lubritrol system provides constant lubrication for trunnion bearings

The new, bigger A-C grinding mills actually *float on oil.* Process industries are grinding out bigger profits because of *Lubritrol* constant lubrication system. No bearing-wearing starts. No dry sliding after shutdown. Less wasted horsepower. All functions of the *Lubritrol* system are automatic...controlled by foolproof pressure gauges and switches. The system is filtered to remove contaminants.

When you modernize your operation, check the benefits of an Allis-Chalmers grinding mill — the only mill that gives you the positive protection, the operating and maintenance economy of *Lubritrol* constant lubrication. *See your A-C representative, or write* **Allis-Chalmers,** *Industrial Equipment Division, Milwaukee 1, Wisconsin. In Canada, write Canadian Allis-Chalmers Ltd., Box 37, Montreal, Quebec.*

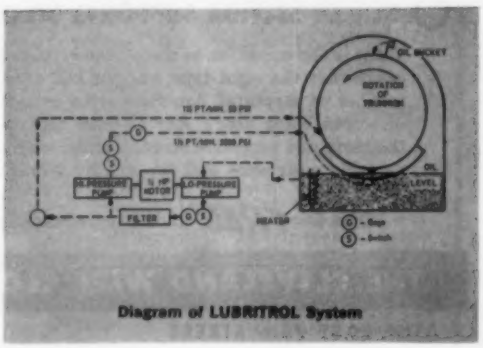


Diagram of LUBRITROL System

Lubritrol is an Allis-Chalmers trademark.

FOR LIMESTONE

FOR CRUSHED ROCK

Webster BUCKET ELEVATORS

WEBSTER Bucket Elevators can handle practically any capacity requirement. Made in centrifugal, perfect or gravity discharge, continuous bucket, and super capacity types. Buckets can be furnished malleable iron, duramal or steel.

The rough, tough service encountered in rock products plants poses many problems for plenty of producers—until they place those problems in the hands of WEBSTER Engineers.

WEBSTER Bulk Materials Handling Systems will keep your production on the move—efficiently and economically—because they are based upon "know how" gained through 84 years' experience. All components of WEBSTER equipment are manufactured and assembled in our own plant.

Write for Catalog BE-55

Webster MANUFACTURING, INC.

DEPT. Q-50, TIFFIN, OHIO

BULK MATERIALS HANDLING EQUIPMENT

SINCE 1876

Offices in all Principal Cities

Enter 56-A on card, page 233

Maintenance Tip No. 2

SCREEN SECTION SUPPORTS ON VIBRATING EQUIPMENT

What is the condition of the screen section supports? Are they worn — are they the right type, number and camber? Are there the right number of supports? Are the covers designed properly for the type of screen being used? Any of these factors can cause whipping of the cloth and excessive screen section wear. Call Cleveland Wire for valuable assistance and top quality vibrating screen section cloth.

Write for **FREE** maintenance-reducing check sheet today.

THE CLEVELAND WIRE CLOTH & MFG. CO.

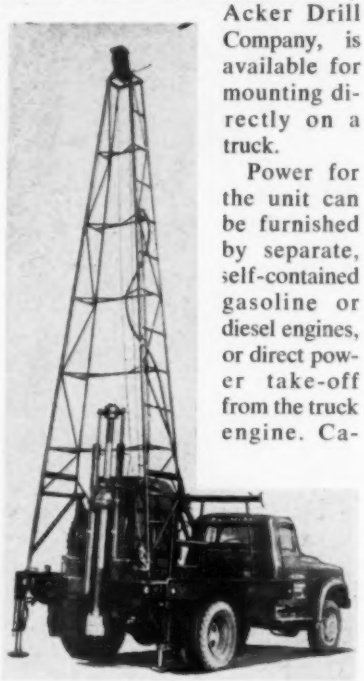
3574 EAST 78th STREET CLEVELAND 5, OHIO

Enter 56-B on card, page 233

minum flows into all the minute spaces between the strands of the wire rope, locking the loop tightly.

According to Reynolds, the aluminum ferrules also are rust-free, corrosion-resistant, and watertight. They are also more economical because they can be formed cold. (365)

● A high-capacity core drill, the Acker Presidente, manufactured by Acker Drill Company, is available for mounting directly on a truck.



Power for the unit can be furnished by separate, self-contained gasoline or diesel engines, or direct power take-off from the truck engine. Capacity of the unit for core drilling is 100 ft.; for auger drilling, to 300 ft. Maximum hole diameter is 24 in.

Among the features are a hydraulic drill head; air brakes and clutch; a new patented automatic chuck; and a wire drum hoist with cathead. (366)

● Quick assembly of hut for work shelter, and storage use is the feature of the Porto-Screen Series "60," made by Frommelt Industries.

A 6- x 6- x 7-ft. hut can, reportedly, be assembled in minutes. Eight standard frames form the side walls, and two form the top. Standard clamp hinges permit panels to be hinged for doors. Any combination of these units, to fit the requirements at hand, can be made. The frames are made of steel tubing panels, complete with Underwriters' Laboratory approved fabric curtains. (367)

ALLIS-CHALMERS

One-man, one-minute product control on these

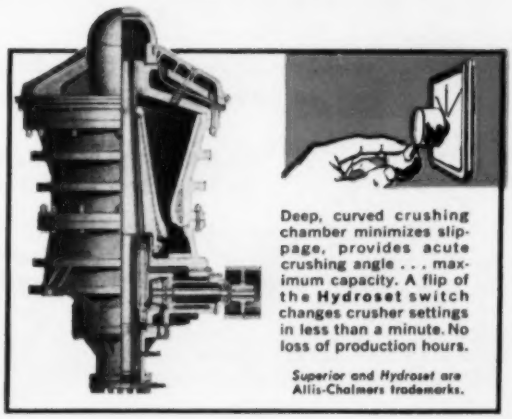
brawny boulder busters!

***Hydroset* mechanism keys *Superior* crusher performance.** For crushing the hardest materials — year in, year out — *Superior* crushers have strength where it counts. They lead the field in dependability and continuous service and, at the same time, give you high capacity and low operating costs.

Best yet, these rock-rugged crushers do it with a flip of the switch. With *Hydroset* mechanism, it takes one man less than one minute for complete product control. This exclusive mechanism compensates for wear, retains initial setting or changes settings in less than 60 seconds. Clears jams just as easily. Slashes downtime and maintenance costs to the bone.

You'll see all the top-profit advantages in Bulletin 07B7870A. For your copy, call your A-C representative or write **Allis-Chalmers,** *Industrial Equipment Division, Milwaukee 1, Wisconsin.*

A-1329



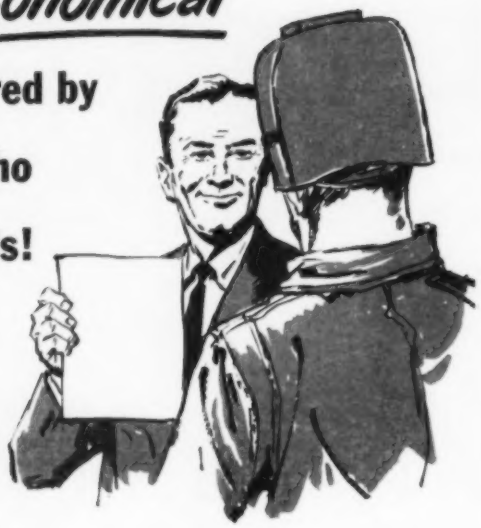
Deep, curved crushing chamber minimizes slippage, provides acute crushing angle . . . maximum capacity. A flip of the **Hydroset** switch changes crusher settings in less than a minute. No loss of production hours.

Superior and *Hydroset* are Allis-Chalmers trademarks.

Ranite Hardsurfacing Rods

are *So economical*

they're preferred by the men who pay the bills!



MEN RESPONSIBLE FOR COSTS—men who must hold expenses in line and show a profit—have seven important reasons for preferring Ranite metallic-coated hardsurfacing rods:

1. Longer wearing parts—reduced downtime—increased production.

2. Repair costs reduced—Ranite-coated surfaces can be cut with oxy-acetylene torch when necessary for repair.

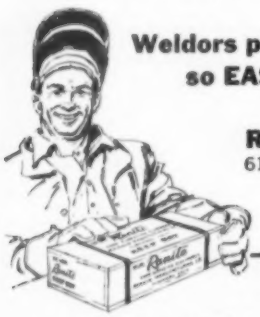
3. More than 80% recovery rate—no unnecessary flux in Ranite coating, maximum amount of coating enters the weld, no slag formed.

4. Rapid deposition rate—maximum metal deposited per man-hour. No splatter loss.

5. Minimum tendency to check—Ranite rods are alloyed with coefficient of expansion and contraction approximating that of parts to be hard-surfaced.

6. Deposits firmly bonded to base metal—Ranite can be applied to all steels, most cast irons and manganese steel *without* stainless bonder.

7. Smaller inventory needed—just five Ranite rods handle the great majority of all jobs. (Types A, BX, C, D and No. 4.)



Weldors prefer Ranite Rods because they're so EASY TO USE. Ask *your* weldors!

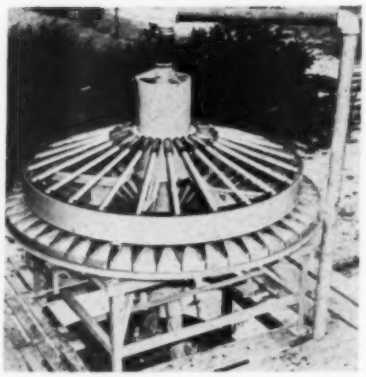
RANKIN MANUFACTURING CO.
616 S. Marengo Ave., P. O. Box 631, Alhambra, Calif.

Sold through your local Ranite Distributor

Originators and pioneers of metallic-coated rods—since 1938

Ranite
WELDORS' NO. 1 CHOICE FOR HARDSURFACING

Enter 58 on card, page 233



● A circular concentrator, developed specifically for high recovery from low-grade ore, is being offered by Cannon Concentrator Company.

The portable concentrator is reportedly the first film-type gravity concentrator that can be installed directly on a dredge to full dredge capacity. Its total headfeed capacity per circular unit (expressed as dry solids) is 30 to 50 t.p.h.

Conditions for optimum stratification are obtained through tranquil flow of a shallow film of relatively high-density slurry (50 to 60 percent solids) down the convergent concentrating segment, or launder. The strata are separated into concentrate, middlings, and tailings products by the splitter blades, which are adjustable, as well as concentric. Suitable beneficiation is usually obtained in three stages of standard countercurrent recirculation.

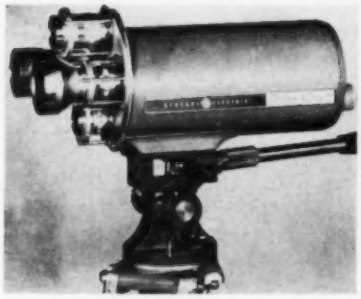
Operating adjustments are two. The vertical adjustment of the two splitters is made by turning the control handles. No wash water, or wash adjustment, is required. Pulp density control is centralized in the main feed sump. Either electronic or manual control can be applied. **(368)**

● General Electric Company has developed a self-contained, single-unit, transistorized TV camera, the TE-9-A, designed to function under extreme conditions of vibration and noise.

The closed-circuit camera is enclosed in a dust-tight housing. The unit, in a field test made by the company, was mounted close to several rocket engines. In all cases, according to the manufacturer, the camera performed continuously, with consis-

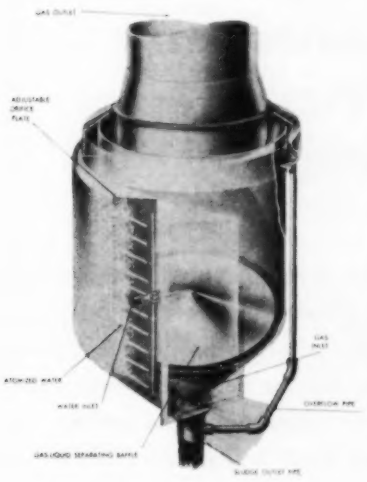
tent picture quality, and withstood the shock and noise without additional protective housing. In one test it was mounted 8 ft. from the engine in an ambient noise environment in excess of 190 decibels.

The camera uses virtually any 16 mm. lens. Four lenses can be mounted on the remote turret at one time. A variety of other accessories are available. (369)



● A new high-energy dust and fume scrubber, the Oriclone, featuring an adjustable rectangular orifice, has been introduced by The Ducon Company.

Should gas flow to the scrubber drop off at a particular point during



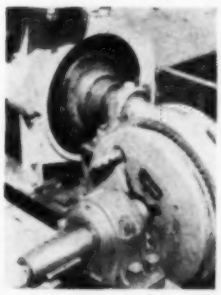
a process cycle, or during specific periods of low velocity, the rectangular orifice can be adjusted mechanically to obtain sufficient gas velocity to maintain efficiency. Efficiencies in excess of 99 percent reportedly can be obtained by adjusting the orifice for capacities ranging from 50 percent below to 20 percent above the rated capacity of the unit. (370)

"Needed A Big Coupling To Lick A Tough Job–Got It With A Lovejoy"

And it's been going steadily for over 1½ years, 16 to 20 hours per day—driving between a 350-hp., 400-rpm. synchronous motor and a preliminary crusher on which 5 other makes of couplings broke down within 6 months. Maintenance during that period amounted to one dusting, solely for the purpose of the above photograph.

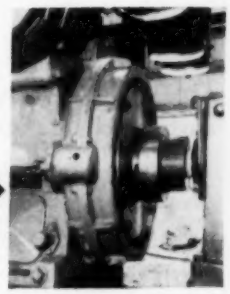
These facts come from a large midwest cement company where clinkers hard enough to cut glass are ground. Other conditions are dust and abrasion, .065 parallel and 2° angular misalignment.

On this and other heavy duty applications, Lovejoy Couplings are saving initial costs, eliminating maintenance and lasting longer. For instance:



Lovejoy CF 280 mounts directly to flywheel of engine to provide compact drive connection to gear box on giant crawler crane.

Lovejoy CF 400 provides direct drive from a 12-cylinder, 400-hp. diesel to a 4-cylinder double compressor.



Remember, too, that Lovejoy Flexible Couplings require only a straight edge to quickly and properly align.

Get the facts. Give us your requirements, and we'll recommend the right coupling—fractional to over 4000 hp. Request Catalog C-58.

LOVEJOY FLEXIBLE COUPLING CO.

4858 WEST LAKE STREET CHICAGO 44, ILLINOIS

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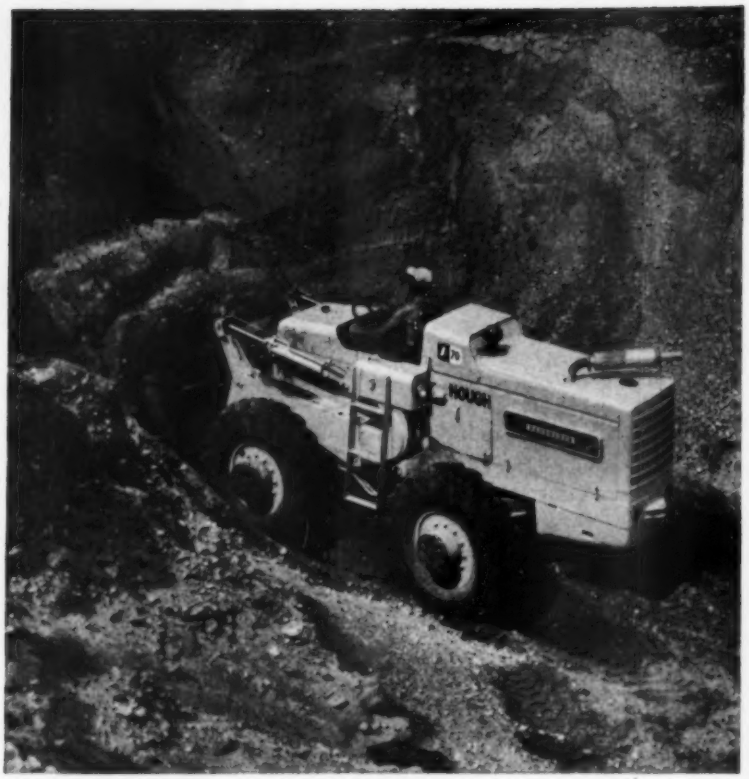
Series B
Model H-70
Model H-90
NOT NEW
but . . .



Series "B" H-70 PAYLOADER

with numerous improvements that give INCREASED PRODUCTION and BETTER PERFORMANCE

"PAYLOADER" leadership over the years is based on superior design, construction and performance of each Model. And "PAYLOADER" leadership is maintained through a policy of progressive engineering. Engineering and research staffs are continually developing and testing new materials, methods, and designs, all directed to improve "PAYLOADER" performance in terms of serviceability and increased output.

As soon as new developments are thoroughly perfected and proved in fleets of test units, they are incorporated into production models. That is why we say the Series B Models H-90 and H-70 are not new machines, but have incorporated into them many new features and design improvements that make them even better performers than before. Your nearby HOUGH distributor is eager to prove it.

PAYLOADER®

Model H-90 Series B

CAPACITY: Operating . . . . 9,000 lbs.
Peak Lift . . . . 18,000 lbs.

NEW ENGINE: New, powerful Cummins Turbo-charged diesel engine develops 162 hp at 2,100 rpm. GMC Diesel is optional—develops 153 hp at 2,200 rpm.

MORE STABILITY: Wheelbase is extended and wheel tread is widened which, along with greater machine weight, greatly increases the balance and stability of the machine for ANY working condition.

MORE TRACTION AND FLOTATION: Standard tire size is increased to 18:00 x 25, insuring more traction and flotation whenever they are needed.

MORE STRENGTH: Front axle, main frame and other structural parts have been strengthened to meet the greater work potential of which this machine is capable.

TRANSMISSION AND TORQUE CONVERTER: Major improvements have been accomplished in the full power-shift transmission and the torque converter, resulting in superior throttle response and operating characteristics.

AIR BRAKES: New air brakes are standard equipment and give more positive action with less operator effort than ever before.

PAYLOADER®

Model H-70 Series B

CAPACITY: Operating . . . . 7,000 lbs.
Peak Lift . . . . 13,000 lbs.

MORE POWER: Available with a larger diesel engine (Cummins 124 hp). Also available with IHC gasoline engine of 110 hp, and GMC diesel engine of 105 hp.

MORE LIFTING POWER: Improvements in the boom arm design and bucket control linkage provide more digging power especially for digging below grade.

HYDRAULIC RESERVOIR: The capacity has been increased to gain greater efficiency for the operation of the many hydraulically-actuated allied accessories that are available, such as: 4-in-1 bucket; side boom; back-hoe.

Series "B" H-90 PAYLOADER

NEW LITERATURE is available without obligation on the Series B Models H-70 and H-90, also, an illustrated folder showing all 10 "PAYLOADER" models and the many useful attachments for each.

HOUGH®

THE FRANK G. HOUGH CO.
LIBERTYVILLE, ILLINOIS
SUBSIDIARY — INTERNATIONAL HARVESTER COMPANY

HOUGH, PAYLOADER, PAYMOVER, PAYLOGGER and PAY are registered trademark names of The Frank G. Hough Co., Libertyville, Ill.

THE FRANK G. HOUGH CO.
750 Sunnyside Ave., Libertyville, Ill.

Please send the following:

- ☐ Data on Series B model H-70
- ☐ Data on Series B model H-90
- ☐ Complete "PAYLOADER" line and all attachments

Name _____
Title _____
Company _____
Street _____
City _____ State _____

4-8-1

cut costs on big quarry jobs!

There's a Davey Rotary Drill to meet every drilling requirement!

DAVEY

ROTARY DRILLS

For faster, more economical drilling . . . increased production at lower cost, leading quarry and open-pit operators rely on Davey. Suitable for mounting on any make of truck, Davey Rotary Drills move fast between blast holes . . . are easy to set in drilling position.

Daveys are available in 8 different models—air blast, mud pump, or combination types. Rated capacities to 3,500 ft. Outstanding features include choice of power take-off or separate power unit operation, automatic hydraulic feed, hydraulic pull down, heavy-duty rotary table, rugged tubular box-type mast.

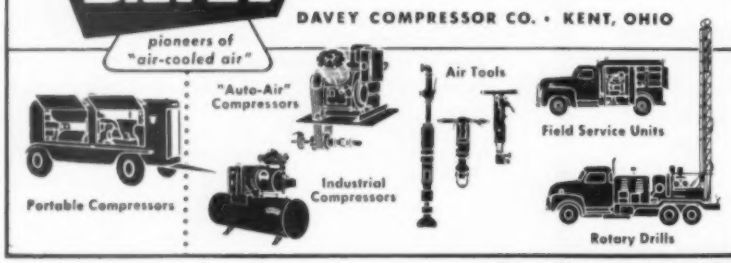
AA-6947

Write for full details!

DAVEY

pioneers of "air-cooled air"

DAVEY COMPRESSOR CO. • KENT, OHIO



Enter 62 on card, page 233

● A new development for the crushed stone industry is the "Veriwet" dust-control system, available from Deynor Corporation.

The system consists of a wet-water mixer (automatic proportioner), valves, spray nozzles, 1-in. piping, and a supply of Veriwet wet-water cartridges. No pumps, motors, or storage tanks are required as the wet-water mixer, which operates on the plant water system, replaces these elements.

The 1-in piping carries the wet-water solution, which throws down and agglomerates the dust before it becomes airborne. Installation can be made by plant personnel without interruption of production. Sales and engineering advice is provided by the company.

The dust control system can be manually operated, with one control valve; or it can be made fully automatic, with solenoid valves, belt trippers to shut off sprays when conveyors are empty, etc. The system can be adapted to the needs of large or small plants. (371)

● New lightweight pigskin safety shoes, weighing 1 lb. less per pair than conventional safety oxfords, have been introduced by the Haus of Krause. The shoe incorporates customary steel-toe protection with casual sport shoe styling.

The shoe construction is possible because of the development of a specially designed foundation for the steel box, the edges of which ride in a channel. This reportedly keeps the edges of the box from spreading under impact, and from cutting into the lightweight sole. The use of pigskin gives natural ventilation. The shoes meet ASA specifications for toe protection against falling loads. (372)

Owens-Illinois, through years of experience, *thinks in packaging terms* in glass and plastic containers, corrugated boxes, closures and multiwall bags.

It pays to buy bags from a packaging specialist

PACKAGING EXPERIENCE assures you of the proper design of the multiwall bag to fit its specific uses, dependability of service to give you the right bag, when and where you need it, and, of course, the finest quality.

Owens-Illinois standards of service, quality control, and design are based on the needs for protection, safe transport, and convenient use of your product.

For the right multiwall bag for every packaging, handling, storage, and shipping method, call Owens-Illinois.

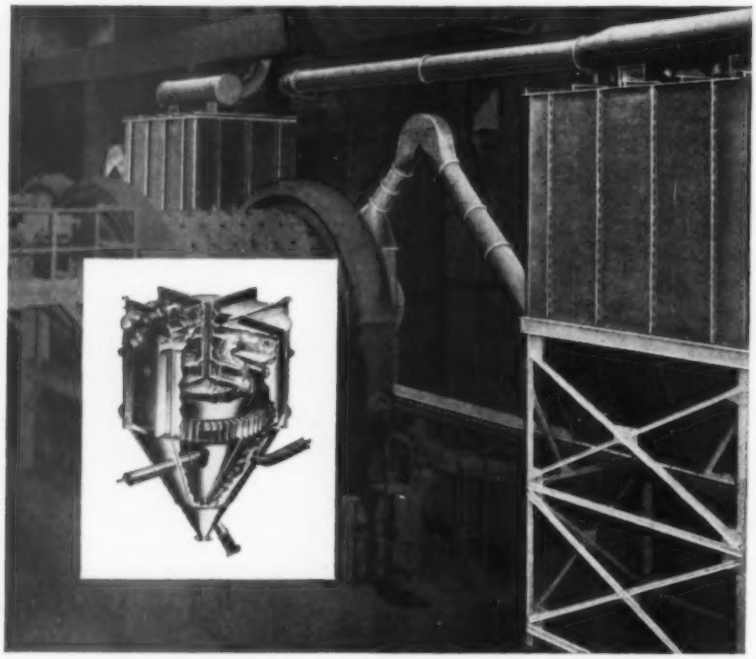
MULTIWALL BAGS
AN (O) PRODUCT

OWENS-ILLINOIS
GENERAL OFFICES · TOLEDO 1, OHIO

Enter 63 on card, page 233

Norblo FULLY AUTOMATIC

Dust Collection Systems and Cement Cooling *in Production Process*



Known wherever cement is made — from coast to coast and in foreign lands — Norblo's service to the cement industry is recognized for its efficient Automatic Bag Type Dust Collection plus the Norblo Cement Air Cooling System* (Patent No. 2,350,737) which combines two separate functions necessary for modern cement manufacture in one installation.

* **Cools both fines and tailings . . .**
* **Reduces cement temperature to 200° or lower . . .**
* **Keeps temperatures inside the mill at more workable levels**

Norblo Automatic Bag Type Dust Arresters with cyclic bag cleaning provide maximum efficiency of collection with low maintenance and operating cost.

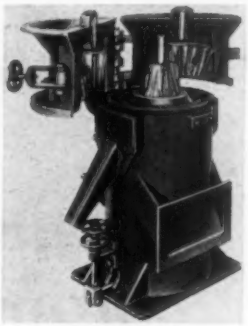
Norblo engineers have wide experience in the cement field and will give you a dependable survey and estimate on adapting Norblo cooling to your present equipment and layout. Write for Cement Air Cooler Bulletin No. 165.

buell Norblo

Buell Engineering Company, Inc.
Northern Blower Division
6409 Barberton Ave., Cleveland 2, Ohio • OLympic 1-1300
Enter 64 on card, page 233

● The Reo Division of the White Motor Company has announced a new, conventional line of diesel-powered tractors, designated the "E" series. The series includes 10 models, with gross vehicle weights from 31,000 to 60,000 lb., with both single and tandem axles.

Cummins diesel engines, with ratings from 180 to 262 hp. are used on all models. A wide range of main and auxiliary transmissions, front and rear axles, and other key components are offered, in order to "custom build" trucks to the customers' specifications. **(373)**

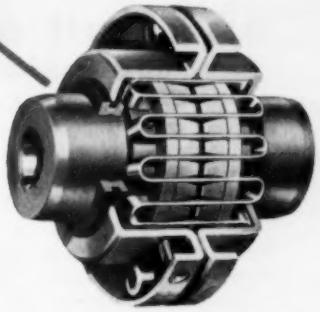


● Sampling equipment is now standard on the full line of rotary crushers offered by Sturtevant Mill Company.

The capacities of the crushers range from 1 to 10 t.p.h. Each of the five sizes includes an auxiliary sample spout, which allows the drawing off of samples of 5, 10, or 15 percent of the feed for lab analysis. The drawn-off sample is homogeneous and cross-representative of the feed, according to the manufacturer. **(374)**

TECHNICAL LITERATURE
offered on page 233
will solve problems for you.

Photo shows portable pump unit connected to internal combustion engine by a Type F FALK Steelflex Coupling



How FALK STEELFLEX Couplings give your connected machinery Double Protection

FIRST: *They protect against shaft misalignment.* Some degree of shaft misalignment is unavoidable—and unless protective compensation is provided, additional loads are developed on shafts, bearings and other revolving elements. The result is excessive wear-and-tear—and often actual breakage....FALK Steelflex Couplings compensate for either angular or parallel misalignment—*or for the more serious condition involving both!* The exclusive Steelflex gridmember which joins the two hubs is not fastened to either hub; thus, either hub can shift in any direction without imposing a load on the other hub.

Yet, important as protection against shaft misalignment is to you, it is only one function of the *truly flexible* FALK Steelflex Coupling.

SECOND: *They protect against torque fluctuations* which create excess wear on connected machines and frequently induce destructive shaft misalignment. The exclusive FALK Steelflex grid-groove design cushions shock loads, dampens vibration, reduces impact loads as much as 30 per cent. You get this extra margin of protection that *can mean the difference between operating and breakdown!* You save on maintenance costs. And —you prolong the service life of your machines!...For complete information, ask your FALK Representative or Authorized Distributor. Or—**write direct for Bulletin 4100.**

FALK and STEELFLEX are Registered Trademarks

THE FALK CORPORATION, MILWAUKEE 1, WISCONSIN

Representatives and Distributors in Most Principal Cities

Manufacturers of Quality Gear Drives and Flexible Shaft Couplings

Basic Type F FALK STEELFLEX COUPLING fills the needs of 90% of industrial applications

This cutaway view shows the exclusive Steelflex design which provides *torsional resilience with the strength of steel.* This torsional resilience spreads peak or shock loads over a relatively long increment of time, thus *greatly reducing stresses* in connected machinery.

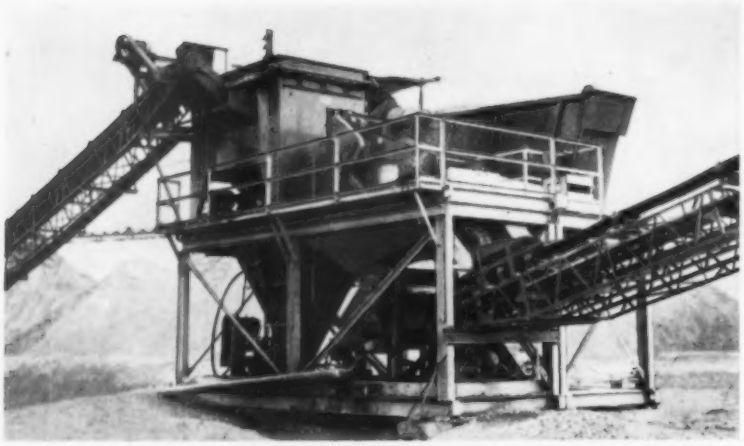
The versatile Type F Steelflex can be used horizontally or vertically, without modification or special parts. It is ideally suited to 9 out of 10 applications. For unusual applications involving overload conditions, extended shafts, brakes, etc., standard designs of dual-purpose Steelflex couplings are available.

For most applications, you can give your machines the extra protection afforded by FALK Steelflex Couplings at no extra cost!

FALK

...a good name in industry

Enter 65 on card, page 233 →



"OUR EAGLE HMS PLANT has solved our chert and soft stone problem"

GILLISSE CONSTRUCTION CO., GRAND RAPIDS, MICH.

To eliminate soft stone and chert from their class B material, to meet Michigan State Highway Dept. specifications, Gillisse Construction Co. uses an Eagle Heavy Media Separation Plant of 50-t.p.h. capacity. Ted Zeeff, Vice Pres., reports "It has solved our chert and soft stone problem. We are pleased with its efficiency and economy. The operator likes its ease of operation."

The Eagle HMS Plant is processing Michigan 6B material (⅜" to 1½") for bridge and overpass construction and 10B (⅜" to 1") for pre-stressed concrete bridge girders. This specification permits only 3% or less of deleterious material. Gravel treated by the Eagle HMS Plant readily meets specs. Sink or beneficiated material runs about 90% and float or rejected material about 10%. Rejected material sold to secondary markets.

The highly efficient O.C.C. separatory vessel used in the Eagle plant makes a float-sink separation on materials with as little as 0.02 difference in specific gravity. If heavy media separation is the answer to your problem, this new high in separating efficiency allows the type of control needed to meet really tough specifications without unnecessary wastage of "good" material.

Gillisse Construction Company, also praises the splendid performance of their Eagle Coarse Material Screw Washer-Dewaterer which processes pea gravel (—⅜"), their Eagle Double Log Washer handling partially crushed gravel, and their Eagle Fine Material Double Screw Washer-Classifier - Dehydrator which handles concrete sand (2NS).

If soft stone or chert is hindering your sales an Eagle HMS Plant can solve your problem. Send for literature.

EAGLE IRON WORKS

ENGINEERS • MANUFACTURERS

133 HOLCOMB AVE., DES MOINES, IOWA

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EAGLE IRON WORKS

Enter 66 on card, page 233

• The "Powder Monkey," a pneumatic device manufactured by Air Placement Equipment Company, and sold exclusively by Spencer Chemical Company, is particularly useful for using ammonium nitrate in horizontal blastholes.

The device, which is said to reduce the time and labor required for loading both vertical and horizontal blastholes, is being marketed by Spencer as a fast, effective method for loading its "N-IV" ammonium nitrate. The model pictured has a

6-cu. ft. capacity (approximately 300 lb. of ammonium nitrate capacity.) Capacities of 15 and 28 cu. ft., either stationary or wheel-mounted models, are also available. (350)

• A miniature engineering seismograph, manufactured by Geophysical Specialties Company, provides information for determining depth to bedrock, the presence or absence of bedrock, and accurate identification of subsurface materials.

Operation of the 16-lb. instrument requires only two men, and can be managed on foot in any type of terrain. (351)

Men of the Industry

E. K. DAVISON—*President of National Sand and Gravel Association*

EDWARD K. DAVISON, recently elected president of the National Sand and Gravel Assn., has been president of J. K. Davison & Brothers, Pittsburgh, Pa., since 1955. He became a member of the firm in 1933 after he had received his civil engineering degree from Princeton University. (He was graduated with a B.S. degree in engineering from Princeton the previous year.)

Mr. Davison is following in the footsteps of his greatuncle, J. K. Davison, who founded the firm in 1854 and started in the business by shoveling and screening sand and gravel from river bars.

E. K. Davison has been very active in industry affairs, has been a member of the board of directors of N.S.G.A. since 1951, and has served on a number of the association's committees. He has been chairman of the committee on public relations since it was first organized in 1955.

At present he represents N.S.G.A. on the following committees: the National Waterways Conference, the National Task Committee on Industrial Waste, and the Industry Hygiene Foundation of America.

Mr. Davison is also a member of the following technical societies: American Society of Civil Engineers, American Society for Testing Materials, American Concrete Institute, and Engineers' Society of Western Pennsylvania.

He is the president of the Pittsburgh Coal Exchange.

G. LOTT JR.—*President Of National Crushed Stone Association*

At the recent 43rd annual convention of the National Crushed Stone Assn., GEORGE LOTT JR. was elected president and chairman of the executive committee for 1960. He is president of Palmetto Quarries Company, Columbia, S. C.

After graduating from The Citadel with a B.S. in civil engineering degree in 1937, he joined Palmetto Quarries as a labor foreman and served in various positions in the firm's engineering and production department. He was elected president in March, 1952.

Mr. Lott served in the Army 4½ years during World War II, and attained the rank of major. He served in the Philippines and the Army of Occupation in Korea.

In local affairs, Mr. Lott is a member of the Industrial Commission for the Columbia Chamber of Commerce, the Rotary Club, and the board of directors of Citizens and Southern National Bank. He is also a member of the South Carolina Society of Engineers. He is active in alumni activities of The Citadel and chairman of various church committees. His hobbies are hunting and fishing.

A. R. ALVIS—*President Of National Limestone Institute*

ARTHUR R. ALVIS, recently elected president and chairman of the board of directors of the National Limestone Inst., has been a member of this group and active in its affairs since it was founded 15 years ago as the National Agricultural Limestone Association.

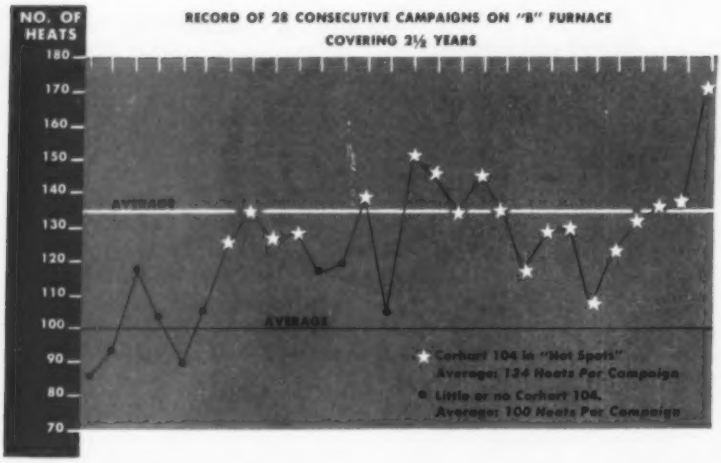
He is now president of Alvis Limestone and Concrete Products, Inc., and Arthur R. Alvis Contractor, Inc., Butler, Mo. Mr. Alvis

has been a rock and limestone producer since 1943, when he located his first plant at West Plains, Mo., to produce lime for Howell County. After six months he relocated his

(Continued on page 94)

Now! Corhart 104 cement kiln

Corhart boosts glass, steel furnace life



CORHART 104 "BEEFS-UP" STEEL FURNACE HOT SPOTS... Corhart 104, the same basic refractory that is now being successfully used in cement kilns, was first developed to "beef-up" trouble areas in steel furnaces. Steel furnace performance curves, such as this one for a 60-ton electric furnace, consistently prove that Corhart 104 withstands the tremendous heat and thermal shock of steel melting cycles far longer than other basic liners. Average "heats" for this furnace increased from 100 to 134 per campaign when Corhart 104 was used to fortify serious wear areas. The result is lower repair costs, more furnace availability, increased productivity.

CORHART ELECTROCAST AFTER FOUR YEARS IN GLASS FURNACE... The Corhart Electrocast lining in this glass furnace firing port has been four years in operation. This record is several times better than can be achieved with ordinary refractories, *yet wear* on the Corhart *is hardly detectable*. It is only one of hundreds of installations where Corhart's resistance to the intense heat and corrosive attack of molten glass has proved superior to that of other glass tank refractories. Since its introduction in 1927, Corhart Electrocast has helped *double* and *redouble* glass furnace life. Today, Corhart is nearly always the predominant refractory in glass tanks.

Electrocast for hot zones!

An electrically-melted basic refractory test-proved superior to conventional basic hot zone liners

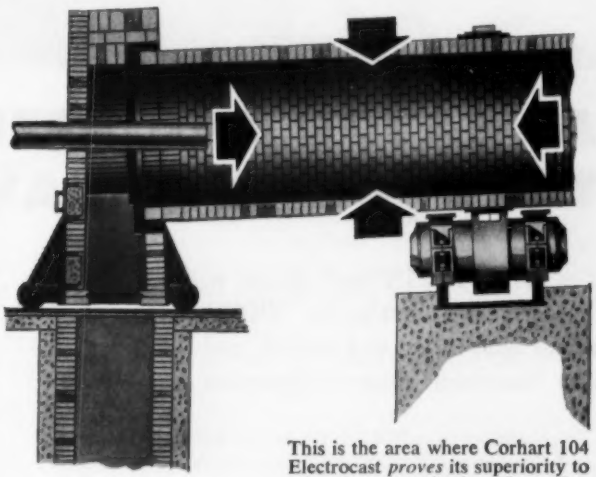
YEAR after year—for more than 30 years—Corhart Electrocast Refractories have *consistently* outlasted *all other* materials in the most severe wear areas of glass furnaces. More recently, real progress has been made in the "Hot Spots" of open hearth and electric steel furnaces. (See reports on opposite page.)

And now, cement kiln operators are installing test-proved Corhart 104 Electrocast in their hot zones for increased refractory life and lower operating costs. Here are some of the reasons why Corhart 104 can provide these benefits:

- **1000° F. margin of safety in operation.**
- **Superior spall resistance.**
- **Readily attracts and tenaciously clings to clinker coating.**
- **Chemically non-reactive with cement clinker.**
- **Improved resistance to thermal shock due to temperature cycling.**
- **Corhart-engineered installations for maximum economy.**

What makes Corhart 104 so superior to other hot zone liners? By far the *most important difference* is Corhart's process called "Electrocasting." This process involves electrically-melting the raw materials at 4450° F. and higher, then pouring into preformed molds. The molten material quickly freezes to form a tight interlocking crystalline structure which is non-porous, corrosion-resistant and possesses great mechanical strength at high temperatures . . . excellent hot zone properties.

Leading cement producers are installing Corhart 104 in extreme hot zones to reduce costly downtime for repairs, to cut total refractory costs and to provide lower operating costs through more continuous production. *Clip and return the coupon below for complete performance data and other details on this new hot zone refractory.*



This is the area where Corhart 104 Electrocast *proves* its superiority to other hot zone basic refractories.

QUALITY ENDURANCE

CORHART REFRACTORIES COMPANY

Subsidiary of Corning Glass Works

The words "Corhart", "ZAC", and "Electrocast" are registered Trade Marks which indicate manufacture by Corhart Refractories Company, Incorporated.

Corhart Refractories Company
946 Commonwealth Bldg.
Louisville 2, Kentucky

Please send me your complete Fact File on Corhart 104 Electrocast refractory for cement kiln hot zones.

Name_____

Company_____

Address_____

City_____ State_____

A MAJOR ENGINEERING BREAK-THROUGH IN EXCAVATOR DESIGN

You get up to 25% more output with "integrated" controls, the "VICON" system of power application and control, and the new "interlock" drum arrangement

The Manitowoc 4500 Vicon is a 6 yard shovel or 7 yard dragline, incorporating an entirely new concept of excavator design and performance. Over 3 years of on-the-job-experience has proved its soundness of design, greater ease of operation; much faster operating cycles; greatly reduced maintenance costs; and far greater output from both shovels and draglines.

"Integrated" Controls Simplify Operation, Clutch Slippage Eliminated

Operating the Vicon is like flying . . . Cycle phases are that smooth, that "integrated"! Even green hands get results because it takes 50% less operator movement to run the machine.

Conventional engine throttles have been eliminated. Each clutch control lever in the high visibility Vicon pilot house is *also* a throttle! Engaging a swing or drum clutch, for instance, involves simply pushing (or pulling) the clutch control lever from dead center (stop) position. The further the lever is moved in the natural direction of the machine's movement the faster and harder it works in that direction.

There is no slippage when clutches are engaged because the first 10° of control lever movement does not activate the throttle—therefore, clutch engagement is effected at low engine R.P.M. and almost zero clutch and drum R.P.M. By *continuing* to move the clutch control lever, which is also the throttle, the machinery is accelerated via fast, smooth, three stage torque converter against the load . . . without *any* clutch slippage.

No Brakes Needed To Stop The Swinging Action

In conventional excavators it is normal to apply considerable "braking" effort to halt the "swing" of the machine so that it can be started in the opposite direction. *Before* "Vicon" it was necessary for the opposite clutch or swing brake to take this thrust (the disadvantages of excessive friction heat and wear are obvious). With Vicon the machine stops swinging one way and very smoothly accelerates in the opposite direction because the torque converter acts like a brake, absorbs directional thrust, eliminates shock and slip on the swing frictions and then provides instant acceleration for the return swing.

Engine Application Has Great Versatility

"Vicon" is two engine power applied in a way never before used for power shovels and draglines . . . and with boundless advantages in performance, maintenance characteristics, and production! One engine provides the power for swing and travel while the other powers the drums . . . allowing you to perform several functions simultaneously, in a smooth blending of cycle phases that provide operating speeds beyond the capabilities of conventional excavators.

Vicon design gives you faster, smoother clutch engagement with drastic improvements on the conventional problem of wear, heat and fade . . . yet you maintain top working speeds.

With the Vicon power application, certain operating advantages are immediately obvious . . . For instance, one engine may be slowed down to accommodate an extremely tough phase of the cycle without jeopardizing the ability of the other engine to immediately take over the following phase of the working cycle. Or, one engine may complete its assignment at a relatively high speed while the power of the other is introduced at idling R.P.M. to take over the next phase of the work. Valuable production time is not lost because of engine "lug down". On the other hand, clutches are not jammed into engagement at high and harmful engine speeds . . . The result, a smoother, faster, more economical operation with greater output, longer machine life, better all-around performance.

"Interlock" Reduces Brake Use By 50%

Vicon operation is so smooth that the machine seems to loaf on the job. Yardage totals, however, tell the true story. For instance, on the Vicon dragline you get the new "interlock" drum arrangement which suspends the dragline bucket in the middle of an endless line . . . cuts brake use up to 50% and you take advantage of full horsepower on the hoist (instead of burning it up on the brakes).

Vicon Has Doubled Drum Brake Capacity

You get higher speed dragline cycles than were ever before possible—and designed into this new Vicon component is another innovation included specifically to give pin-point control and increase production.

Both outside flanges of both the front and rear drums of the Vicon serve as big, fast acting efficient braking surfaces. The advantages are readily apparent on various stripping locations where the operators take pride in maintaining such pin-point casting control that they actually trim and maintain vertical side walls. It is common, for instance, to see a Vicon operator taking advantage of Vicon "Interlock" making high

speed casts with the bucket held in a vertical position (teeth down). The bucket rushes out at full speed, is stopped smoothly over the top of the cut and then allowed to drop vertically to trim the wall. Vicon dragline drum "interlock" and drum brakes are in a class by themselves. Production gains are assured!

Other Innovations Are Yours With Vicon

For instance, a big universal radiator system gives you double the cooling capacity. Advantages of the Vicon cooling system are never more obvious than in prolonged travel with the Vicon maneuvering easily from one job location to the other. Travel, a situation embodying the most serious over-heating possibilities for the conventional machine, is no problem for the Vicon . . . which simply utilizes two engine cooling capacity for the operation of a single power system.

Shovel Has Less Weight—More Power On "Business End"

The Vicon shovel has all the advantages of the big, tough Model 4500 tubular style dipper stick and having separate hoist lines rigged from either side of the shovel bail to the other end of a reduction drive mounted on the base of the shovel boom—eliminating the weight and instability of a bail sheave at the bucket, plus bad fleet angles on the hoist cables.

There are many, many more design and operating features adding up to more output—reduced maintenance costs and lower cost yardage. Before you buy any machine in this class, it will pay you to get the complete story on the sensational 4500 Vicon.

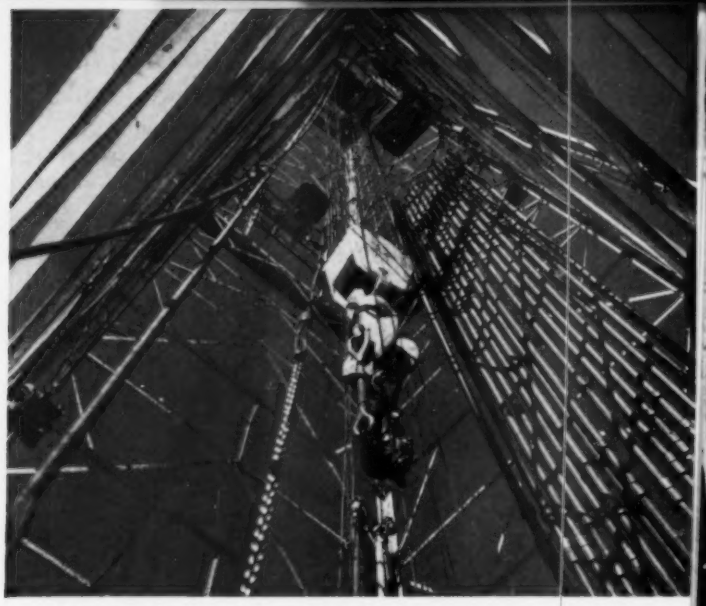
Manitowoc

MANITOWOC ENGINEERING CORP.

(A Subsidiary of The Manitowoc Company, Inc.)

Manitowoc, Wisconsin

SHOVELS	CRANES	DRAGLINES	TRENCH HOES
1¼ — 6 YDS.	25 — 125 TONS	1¼ — 7 YDS.	1¼ — 3 YDS.



Drilling for oil—USS Tiger Brand Rotary Drilling Lines on one of the world's deepest wells—combine strength, toughness and long service life.

From the Tiger's mouth—

How to get

Regardless of the type of equipment you operate or the size, grade or construction of the wire rope you use—when you get better service from that wire rope you save money.

Proper selection and care of your wire rope will pay off in longer rope life and consequent operating economy. Here are 10 ways to increase the life of wire rope:

1. Get the right rope. Carefully examine the operating requirements for your rope, determine how heavy the loads will be, how much abrasive wear, distortion, or crushing the rope must withstand, and how flexible it must be. Then choose the USS Tiger Brand Wire Rope that has the properties you need . . . there is one for every type of job.

2. Unreeling. To prevent kinking, be sure the reel or coil is free to rotate as the rope unwinds. Mount reels on an unreeling stand or on a shaft supported by two jacks. Otherwise, hold the rope end and roll the reel along the ground to unwind the rope. Always use this latter method for coils.

3. Sheaves and drums. Align all sheaves. Be sure that sheaves and drums are free to rotate and large enough in diameter to prevent sharp bending. Grooves must be slightly larger than the rope diameter and, if scored or badly worn, should be reground before new ropes are installed. Sheaves with broken flanges should be replaced immediately.

Strip mining—USS Tiger Brand Hoist Rope for strength with flexibility, Tiger Brand Drag Lines for strength with abrasion resistance, and Tiger Brand Boom Supports for high resistance to vibration fatigue.

Building a super highway—USS Tiger Brand Shovel Rope, Dozer Rope and Scraper Rope give longer service with less down time.

Lifting industrial loads—USS Tiger Brand Slings lift the heavy loads safely. Crane hoist ropes provide strength and flexibility.

more service from your wire rope

4. Wire rope fittings. Install sockets, clips, swaged fittings or spliced loops or thimbles depending upon service requirements. Tiger Wire Rope Sockets, properly attached with molten zinc, develop the full strength of the wire rope.

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10. When in doubt. If you need help in selecting the right rope or in setting up good maintenance procedures, call in a Tiger Brand Wire Rope Engineer. He can give you expert advice on any wire rope problem. Just call our nearest distributor or send the coupon.

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The Editor's Page

This Bill Must Be Stopped!

ANOTHER serious emergency recently arose on the labor front when the Labor Committee of the House of Representatives, by a 21 to 5 vote, recommended that the House take favorable action on H.R. 9070, better known as the Kennedy-Thompson or "Common Situs" Bill. This bill would in effect legalize picketing resulting in secondary boycotts and invite the construction unions to impose product boycotts on the many materials that go into building projects. It would give the unions even greater power than they now have and would endanger not only our economy but also our national security.

Before this bill can come before the House for a vote, it must first pass the House Rules Committee. If it gets a "special rule," the bill may quickly pass the House and Senate and be signed into law by the President—unless the public acts effectively and swiftly to tell the members of Congress that this dangerous proposal should be killed.

AS IN similar instances in the past, the National Sand and Gravel Association has taken a definite stand against this new threat to industry and has urged its members to voice their opposition. It is pointed out that if this bill becomes law, it will:

"1. Give an additional and potent weapon to racketeers in those areas of the labor movement—the building trades—which have been traditionally the most racket ridden.

"2. Hand to Jimmy Hoffa and his Teamsters Union a substantial grant of additional power.

"3. Force employees to join unions in the construction industry by the use of blackmail picketing, despite the fact that such picketing has been outlawed in the rest of American industry.

"4. Invite the construction unions to get a strangle hold on thousands of products that go into all sorts of building projects.

"5. Subject all sorts of building projects, ranging from giant missile bases to small retail store repair jobs, to the picketing and related harassment simply because of an argument between one of many unions and one of many contractors.

"6. Increase materially the cost of houses and the cost of all sorts of construction, both private and public.

"7. Encourage uneconomic restraints on trade in the very industries where such restraints have stifled competition and raised costs.

"8. Permit secondary boycotts in the one industry that provided the most numerous and the most glaring examples of this evil in the hearings that led to the Taft-Hartley Act.

"9. Strike a blow at the heart of one of the most important provisions of the labor-management reform legislation passed by Congress last year following an overwhelming outpouring of public sentiment against fraud, corruption, and violence in labor unions.

"10. Establish a disastrous precedent by the eventual piecemeal destruction of essential and hard-won control over vicious and uneconomic union practices."

We urgently recommend that all producers contact the congressmen from their districts at once, urging defeat of the Kennedy-Thompson Bill. As the fate of the bill may actually be determined in the House Rules Committee, those producers whose congressmen serve on the committee should communicate with them, making their opposition to the bill clear. There is still time to do this.

Walter E. Trauffer

A. B. Cummins (Johns-Manville Corp.), newly elected president, Society of Mining Engineers of A.I.M.E.

88th A.I.M.E. Meeting

Industrial Minerals Stressed

THE American Institute of Mining, Metallurgical and Petroleum Engineers held its 88th annual meeting in New York, February 14 to 18, 1960. Technical papers were presented on a wide variety of subjects. In addition to papers dealing with developments in the mineral industry of the United States, considerable attention was devoted to mineral developments in Communist countries. The meeting brought together nearly 5,000 engineers and scientists, many of whom were from foreign countries.

Convention hotels were the Statler Hilton, headquarters for the Society of Mining Engineers of A.I.M.E. and for the Society of Petroleum Engineers of A.I.M.E., and the Sheraton-Atlantic Hotel, where the Metallurgical Society of A.I.M.E. held its sessions.

Joseph L. Gillson, chief geologist, E. I. duPont de Nemours & Co., Wilmington, Del., is the new president of A.I.M.E. He succeeded Howard C. Pyle, president, Monterey Oil Co., Los Angeles. Ronald R. McNaughton, manager, Metallurgical Division, Consolidated Mining & Smelting Co. of Canada, Ltd., Trail, B.C., Canada, became A.I.M.E. president-elect; he was nominated by the board of directors to take office in 1961 following Dr. Gillson's term.

Dr. Gillson has been very active in A.I.M.E. affairs for many years and is well known throughout the mining industry, particularly for his work on industrial minerals, in which he has specialized for many years. His most recent post was that of editor-in-chief of the new edition of *Industrial Minerals and Rocks*, which has just been published by A.I.M.E. In his inaugural speech, which took the form of a forecast for the mining industry in 1960, Dr. Gillson covered the situation in petroleum, metals, and industrial minerals, stating that the outlook for the mineral industry at the beginning of 1960 is not clear.

Referring to industrial minerals, he pointed out that most segments of the industrial mineral industry are looking forward to a larger demand for their products in 1960 than was the case in 1959. Construction, he said, has been the main pillar of our economy during the last several years. Total value of construction in 1960 is forecast at $56 billion, exceeding that of 1959 by 2 percent. This will benefit producers of asbestos, crushed stone, sand, gravel, gypsum, mineral fillers, diatomaceous earth, clays and pigments. Sales in 1960 for all units producing nonmetallics—including cement, sand, gravel, and lime—are estimated at $3 billion. This group of industries Dr. Gillson stated, has practically doubled its capacity for production during the last 10 years. Sales of in-

Top brass of A.I.M.E., left to right: Howard C. Pyle (Monterey Oil Co.), immediate past-president; Joseph L. Gillson (E. I. du Pont de Nemours & Co.), president; Ronald R. McNaughton (Consolidated Mining & Smelting Co. of Canada, Ltd.), president-elect.

Covers Wide Range

subjects included: Communist mineral progress, industrial water resources, salt production developments, cement and gypsum, nonmetallic mineral fillers

dustrial minerals used in the heavy chemical industry, he predicted, will be a little larger than last year.

Arthur B. Cummins, also prominent in the industrial minerals field, was installed as president of the Society of Mining Engineers of A.I.M.E., succeeding Jerome W. Woomer, consulting engineer, Pittsburgh. Dr. Cummins is manager, Mineral and Basic Research, Johns-Manville Corp., Manville, N. J. He is well known for his research on industrial minerals, particularly asbestos and diatomaceous earth.

Dr. Cummins, in his forecast for the American mining industry in 1960, predicted that it would be a good year for mining but that the pattern would be spotty. In the section of his speech dealing with industrial minerals he stated that most industrial minerals are expected to be in demand equal to or above 1959 levels.

Dr. Cummins referred particularly to abrasives, clays, borax, limestone, gypsum, phosphate rock, potash, salt, and sulphur. Production of cement may drop 3 to 4 percent from the 1959 level because of a slowdown in the federal highway program and to an anticipated reduction in home construction. Production of sand, gravel, and stone may be expected to parallel that of cement. Dr. Cummins believes, however, that this situation will be temporary and that the years ahead hold great promise for all industrial minerals.

Referring to the mineral industry of Russia, Dr. Cummins said that currently Russia may be producing about 16 percent (value) of the world's total in mineral products *versus* 30 percent for the United States. However, the ratio of Russia's increase in production over that of the United States each year is significant, and that it may increase even more in the future, since the Sino-Soviet group of nations is considered virtually self-sufficient in minerals.

Dr. Cummins pointed out that the demand for mineral raw materials moves with general economic trends. The mining industry, *per se*, will not set the pace, but it will follow the technological, economic, and political developments of the next decade, he declared.

A number of prominent members of A.I.M.E. were honored at the meeting. Among them was Samuel H. Dolbear, president of the firm of Behre, Dolbear and Co., Mining Engineers and Geologists, New York. Mr. Dolbear received the Hal Williams Hardinge Award, which is given for achievement in the field of industrial minerals. Mr. Dolbear's citation read, "Eminent mineral consultant and engineer—first chairman, Industrial Minerals Division of A.I.M.E.—first editor *Industrial Minerals and Rocks*—for the improvement and increase of industrial minerals knowledge."

Raymond H. Feierabend (Freeport Sulphur Co.), new chairman, Industrial Minerals Division of A.I.M.E.

At the business meeting of the Industrial Minerals Division, a new slate of officers was installed for the term 1960-61. They are as follows: chairman—Raymond H. Feierabend, assistant vice-president, Freeport Sulphur Co., New Orleans, succeeding Dr. John G. Broughton; secretary-treasurer—J. S. Holland, National Lead Company, New York. Six regional vice-chairmen were also appointed.

Papers presented at the technical sessions of the Industrial Minerals Division covered a wide variety of subjects including dimension stone, industrial waters, abrasives and fillers, rare and radioactive minerals, ceramic raw materials, chemical raw materials, cement, and gypsum. Some very interesting papers were also presented on Communist mineral technology and mineral resources.

Communist Progress K. P. Wang, a specialist on Far East affairs, outlined the mineral resources of China in a paper entitled *Rich Mineral Resources Spur Communist China's Bid for Industrial Power.*

"Under the Communist regime remarkable industrial progress has been achieved on the Chinese mainland," he conceded. "The industrial capacity of China is beginning to approach that of Japan and, in all likelihood, will surpass it by 1962. While Communist China is well on the road to becoming a world power, its living standards will remain below European levels for many years to come. The mineral industry looms large in the overall economy, and it already contributes significantly to the gross national product. In 1958 the value of mineral output comprised 4.5 percent of the G.N.P."

While the most outstanding developments in the mineral field have to do with coal, iron, and steel, as well as with certain metallic minerals such as antimony, tungsten, and tin, the industrial minerals are of growing importance; and production of certain ones now constitutes 8 to 20 percent of the world total. These include salt, fluorite, graphite, magnesite, and talc. Others such as cement, asbestos, mica, pyrite, and sulphur are being produced at 2 to 4 percent of the world total. China appears to be more than self-sufficient in most minerals, particularly nonmetallic minerals.

The bulk of the undeveloped mineral wealth, however, lies in west and north China, whereas 80 percent of the population is in the eastern third of the country, and transportation facilities are inadequate. To overcome this problem, considerable emphasis has been placed on building local industries around resources and markets—a program that has met with only partial success. Communist China has the mineral potential to become a first-rank industrial power, but ability in organization and technical management there remains unproved.

James D. Piper, vice-president, Portland Cement Association, Chicago, gave a paper covering *Concrete Technology in the U.S.S.R.*, which was based on his observations as a member of a six-man delegation from the United States that visited Russia in May, 1958. He found that research was largely applied, rather than basic, and that great emphasis was placed on research into precast and prestressed concrete. He noted that electronic and mechanical equipment in the laboratories was of good quality but that conrol of concrete materials was poor, rated by the standards prevailing in the United States.

The Moscow Project Institute, which sets the standards for all construction in Moscow, has succeeded in standardizing 85 percent of all construction in that city. A design bureau in Leningrad supplies information on concrete design for all parts of the Soviet Union, as well as for Communist China and satellite countries. Basically, the design bureaus concern themselves with precast concrete elements, but much information is also supplied on prestressed concrete.

One reason for the emphasis on prestressed concrete is that it permits large savings in steel. A high degree of standardization was found to exist in finished precast and prestressed products, but production methods vary greatly from one plant to another.

A survey of recent Russian technical literature pertaining to inorganic materials formed the basis of a presentation on *Inorganic Materials Research in the U.S.S.R.*, by W. G. Lawrence, chairman, Department of Ceramic Research, State University of New York, College of Ceramics, Alfred, N. Y. He was of the opinion that the quality of the papers published in Russia is equal to that of papers on similar subjects published in the United States, and that the volume of such literature is far greater than in the United States.

Most of Mr. Lawrence's paper dealt with Russian work on structural clay products. Summaries were given on theories of the hardening of concrete; effect of surface active agents on the hydration of portland cement; corrosion resistance of cements; setting of asbestos cement products; and hardening of acid-resisting cements. A summary of subjects discussed at the conference of 550 members in 1955 regarding the chemistry of cement was also given.

According to published information, the structural clay products industry in Russia is running at capacity, Mr. Lawrence reported, to provide brick for the tremendous building program now under way. Much work is going on in connection with the production of lightweight aggregates from clays and shales; and sand-lime brick production is booming.

A specialist in East European affairs, Alexander Gakner of the United States Bureau of Mines, presented a paper entitled *Minerals and Monopoly—Formula for Soviet Success*, in which he said that national planning and the directing of all national energies to the attainment of objectives—methods which are possible under Soviet autocracy—have resulted in great progress in the mineral industries of the U.S.S.R. This achievement, coupled with rich mineral resources, has placed that country in a position to wield power in world mineral affairs. The U.S.S.R. now accounts for more than one-sixth of the world's mineral output on the basis of value, and Russia is the most nearly self-sufficient of all the leading industrial nations.

About one-third of the Soviet foreign trade by value is in minerals and metals, and the mineral industry of the U.S.S.R. is looking forward to the utilization of vast untapped resources. This fact, Mr. Gakner declared, poses a growing threat to the economics and international markets of the nations of the Free World. On the other hand, said the speaker, the U.S.S.R. requires 60 percent more people to produce minerals equal to about 60 percent of the value of the United States mineral output, and Russia could not compete in world markets if it were not for the fact that the Russian people work for low wages.

Industrial Water "Recent technological advances have reduced the cost of converting sea water into fresh water and have raised new hopes for increasing the world's fresh-water resources," averred W. S. Gillam, chief, Basic Research Division, Office of Saline Water, Department of the Interior, Washington. He presented a paper entitled *The Cost of Converting Water*, in which he outlined the various potentially feasible processes under

investigation. These, he said, may be conveniently classified into four fields (1) distillation; (2) processes using membranes; (3) freezing; and (4) others including chemical, electrical, and biological processes.

Plants using distillation and freezing processes are already in operation in certain arid parts of the world. At the present time 16,000,000 gal. per day of fresh water are distilled from sea water in commercial plants, at a conversion cost ranging from $1.85 to $2.25 per 1,000 gal., and with further cost reduction in immediate prospect.

In 1951 the cost of converting sea water to fresh water by distillation, using relatively small units, was estimated at $5 per 1,000 gal. Improved processes and equipment have now cut the cost to about $1 per 1,000 gal.; and it may soon be possible to convert sea water at a cost of 50 cents per 1,000 gal., and brackish water at a cost of 30 cents per 1,000 gal.

It was emphasized by Mr. Gillam that these costs include interest on capital investment, and that this charge alone could amount to one-half of the total cost of the water produced. Only rarely do town and city water rates include all capital costs; and there may be a big difference between rates and true costs, because the rate may reflect only a small percentage of the actual cost. Furthermore, in making a comparison, the cost of obtaining new supplies of fresh water should be considered, rather than the cost of present supplies.

Salt Two papers were presented concerning a new process for improving the quality and appearance of rock salt. The first of these papers, *Development of a New Dry Method for Mineral Separation,* by R. J. Brison and O. F. Tangel, assistant chief and chief, respectively, of the Minerals Beneficiation Division, Battelle Memorial Institute, Columbus, Ohio, reported on a project sponsored by International Salt Company for its Detroit mine.

The second paper, *Beneficiation of Rock Salt at the Detroit Mine of International Salt Company,* by W. C. Bleimeister of International Salt Co. and R. J. Brison of Battelle Memorial Institute, described the design

Howard C. Pyle, immediate past-president of A.I.M.E.

and operation of the first commercial unit employing this process. This unit is now operating at the Detroit mine. The process, which is covered by patent applications, is based on the ability of rock salt to transmit radiant heat, whereas the principal impurities—dolomite and anhydrite—will not transmit heat to the same extent. There are two main steps in the process: (1) selective heating of the crushed product by radiation and (2) separation of the heated particles on a heat-sensitive surface.

After much experimentation, it was found that the 500-watt standard industrial infra-red lamp provides a satisfactory heat source. These lamps are mounted inside a revolving screen which serves as a means for the removal of fines as produced. The size range of the salt particles used in the process is ¼ to ½ in.

After one minute of exposure in this screen the salt particles are fed on a moving neoprene belt. The latter is coated with a polymerized styrene resin heated to the point at which the resin coating becomes slightly tacky. The cool salt particles do not stick to the resin and are thrown off at the head pulley, while the dolomite and anhydrite particles adhering lightly to the resin coating are carried around the head pulley and either drop off or are scraped off by a wire. In this way the salt can be up-graded to 99 percent NaCl, and all dark particles can be removed from the feed that analyzes less than 97 percent NaCl. The grade of salt that can be produced most economically analyzes 98 percent NaCl.

Following the successful outcome of the laboratory work, a unit having a capacity of 500 tons per 15-hour day was built at the Detroit mine of International Salt Co. and it has been in operation since March, 1957. The revolving screen, 8 ft. in diameter and 24 ft. long, revolves at 2.7 r.p.m., and has a slope of 2 in. per foot. Screencloth with ¼-in. openings is used. The heating unit consists of 240 infra-red 500-watt lamps. Retention time of the salt on the screen is 1 minute.

The resin-coated conveyor is 5 ft. wide and 22 ft. long, center to center of the pulleys. It travels at 960 ft. per minute. The particles are on the belt 1.2 seconds. Rock salt, either No. 1 grade (particle size 0.279 to 0.375 in.) or No. 2 grade (particle size 0.375 to 0.500 in.), is fed to the belt by transfer equipment that insures uniform distribution. Heated resin is continuously sprayed on the under side of the belt in a very thick film. The built-up coating of resin is removed every 15 hours.

This unit is producing either 98 percent NaCl with a high recovery, or 99 percent NaCl with a lower recovery. Cost per ton of cleaned salt, based on 15 hours of operation per day at a fed rate of 32 tons per hour is as follows:

Depreciation	$0.09
Maintenance	0.08
Electricity	0.06
Resin	0.03
Miscellaneous	0.07
Total	$0.33

The authors of the paper are of the opinion that the development of this new dry method of mineral separation may open the way to a number of processes, not only for mineral separation but also for separation of such diverse materials as chemicals, plastics, metals, and agricultural products.

In their paper, *Solution Extraction of Salt Using Wells Connected by Hydraulic Fracture,* C. A. Bays, Urbana, Ill., W. C. Peters of Food Machinery and Chemical Corp., Denver, Colo., and M. W. Pullen of Purdue University, West Lafayette, Ind.,

Dr. John G. Broughton, immediate past-chairman, Industrial Minerals Division.

described an improved process for the recovery of salt from underground deposits by brining.

They apply the principles of hydraulic fracturing, as used in the oil industry, and connect two or more wells by creating a fracture in the salt at the bottom of the deposit. The fracture is started by the hydraulic pressure of fresh water and is extended by continuous pumping until communication between the wells is established. The opening thus made is enlarged by pumping fresh water through it until a sufficiently large channel is developed. Non-shrinking cement that will bond with both the salt and the associated rock strata is essential to the process.

The minimum pressure required to start a fracture in salt is about 0.9 p.s.i. per foot of overburden; but for design purposes, a figure of 1.8 p.s.i. should be used. Pressure up to 4,750 p.s.i.g. have been used in starting the fracture. Once a fracture has been satisfactorily established, a pressure differential of 125 p.s.i. is sufficient to operate the wells. At present the method is limited to well spacings up to about 1,200 ft. The method has been used satisfactorily in bedded salt and is applicable to wells in salt domes.

Ceramic Raw Materials *Synthetic Mullite as a Ceramic Raw Material*, a presentation by E. A. Thomas and Karl W. Smith of the Charles Taylor Sons, Company, Cincinnati, Ohio, dealt with processes used in the United States for making synthetic mullite and compared the products with Indian kyanite.

Uncertainty of supply of Indian kyanite during World War II, and the export restrictions placed by the government of India on the kyanite —thereby causing a price increase— made the economics of synthetic substitutes favorable. Fine-grained, massive kyanite such as is found in India has not been found on this continent. The domestic kyanite occurs as crystals disseminated through gneissic and schistose rocks. It can be freed from the associated minerals only by grinding the rock to about 35 mesh.

Commercial grades of domestic kyanite are now used extensively in making refractory cement, as a fine fraction in mullite mixes, and as additives in other ceramic compositions; but they have not yet proved to be preferred materials for making synthetic mullite.

Satisfactory grades of synthetic mullite have been developed from siliceous bauxite or kaolinitic bauxite found near Eufaula, Ala., from mixtures of bauxite and clay, and from kaolin and alumina mixtures. Physical tests and service results from these synthetic products now assure the availability of mullite-type super refractories from sources other than the sillimanite groups of minerals.

A. Allan Bates (Portland Cement Association) spoke on trends in construction and architecture.

Cement and Gypsum In his paper *The Role of Gypsum in Portland Cement*, Warren H. Weisz of the Portland Cement Association, Research and Development Laboratories, Skokie, Ill., referred to the early history of gypsum and cement. He outlined the processes of cement manufacture, discussed the theories of setting and hardening of cement, and reviewed the use of retarders. Raw gypsum ($CaSO_4 \cdot 2\,H_2O$) is the generally used retarder, but calcium sulphate may also be used in the form of the hemihydrate ($CaSO_4 \cdot \frac{1}{2}\,H_2O$), soluble anhydrite ($CaSO_4$), and natural anhydrite ($CaSO_4$). Hemihydrate, or plaster of paris, is obtained by calcining gypsum at temperatures ranging from 230 to 285 deg. F. Soluble anhydrite is obtained by calcining gypsum at temperatures ranging from 325 to 395 deg. F.

Natural anhydrite is a mineral, but it can be obtained by calcining gypsum at a temperature around 1,200 deg. F. Both hemihydrate and soluble anhydrite are more powerful retarders than gypsum and are practically equivalents. Natural anhydrite, said Mr. Weisz, can be used as a retarder, but it requires an admixture of raw gypsum for satisfactory results. The chemical factors affecting the setting of portland cement and the effect of gypsum and other retarders on heat evolution, shrinkage, and strength were discussed. Methods used in industry to determine and control the quantity of gypsum to be added to obtain the optimum amount of SO_3 in the finished products were described.

A. Allan Bates, vice-president for Research and Development, Portland Cement Association, Chicago, in his paper, *Trends in Construction and Architecture and Their Effects on Consumption of Industrial Minerals*, traced the effects of major technological advances on architecture and the construction industry, and showed how these, in turn, affect the production of industrial minerals.

Usually, he said, the effects of major technological changes take place slowly through their impact on sociology. For instance, the invention of the internal combustion engine and the telephone had a major

effect on the great trend toward urbanization now in progress.

Occasionally, however, as exemplified by the rapid development of prestressed concrete, technological advances are rapid. Results of projecting the effects of trends into the next two decades or so may not be exact, but they are useful, and all signs at present point to a greatly increased demand for industrial minerals in the future. This forecast is borne out by the steadily increasing proportion that industrial minerals comprise of the gross national product. Dr. Bates presented figures showing what the yearly increment in G.N.P. would mean to producers of industrial minerals during the next few years by way of increased demand for their products. With this increase in quantity, said Dr. Bates, there will be a demand for improvement in quality.

The digital computer is useful in monitoring and controlling parts of the cement-manufacturing process, according to Peter B. Nalle and LeRoy W. Weeks of Riverside Cement Company in their paper, *The Use of Digital Computers in the Mining Industry*. It is a valuable new tool, and its use should result in a longer life for deposits of raw materials and more efficient use of quarry equipment and manpower; it should also give rapid and accurate information on how to obtain lowest cost production, highest total production, and highest profit. Most companies have personnel who with training and aid from computer manufacturers can program and operate a computer. The Riverside Cement Company has been using a computer with good success for almost a year to solve raw material blending problems. (SEE PIT AND QUARRY, March, 1960, p. 86.) The authors cited specific examples illustrating how a computer can be used to advantage.

Mineral Fillers Donald R. Irving, assistant chief, Branch of Ceramic and Fertilizer Materials, Bureau of Mines, Washington, in his paper *Some Beneficiation Techniques Applicable to Mineral Fillers*, described the work being done in his branch on the beneficiation of clays and silica sands. He stated that fire clays containing quartz and pyrite in particles coarser than the clay particles generally can be upgraded either on a gravity table or in a hydraulic cyclone, to the extent that a product possessing improved refractoriness is obtained. Kaolinitic clays from southwestern United States which contain an excess of material larger than 2 microns must have the coarse material removed; and it is estimated that if the rejected coarse fraction could be ground economically, the reserves of paper-coating clays and paper-filler clays could be increased by 25 percent. The necessary fine grinding has been accomplished in an attrition grinder developed in the Bureau of Mines. Details of the process and equipment are to be given soon in a Bureau of Mines publication. Work on the production of high-grade silica sand and clay for paper filler from a sandy clay deposit in Idaho was also described.

In a paper on *Nonmetallic Mineral fillers in Plastics*, Robert D. Thomson, acting chief, Division of Mineral Industries, Region V, Bureau of Mines, gave the results of a survey of the use of fillers in the plastics industry, one of the fastest growing industries in the nation. Both organic and inorganic materials are used as fillers. Organic fillers include wood flour, cotton flock, and nutshell flour. The inorganic fillers are mostly industrial minerals including asbestos, limestone, clay, mica, wollastonite, diatomaceous earth, and talc. One of their functions is to lower the cost and decrease shrinkage. No one mineral filler has all the desirable qualities, since there is a wide variety of physical and chemical properties to consider in order to obtain a filler that will best give the characteristics desired in the product.

Dimension Stone Arland R. Krueger, Toledo Cut Stone Company, Toledo, Ohio, claims that a rosy future lies ahead of the building stone industry because architects and builders are rediscovering stone as a building material that offers unsurpassed values in beauty and usefulness. In his paper *Quarried Stone Meets the Challenge of Contemporary Architecture*, he claims that quarried stone is benefiting greatly from "the all-out revolution now taking place at quarries throughout the country."

Referring to improvements in quarry equipment, techniques in drilling, cranes for lifting blocks, and abrasives for cutting, he said that "perhaps the most revolutionary step forward was the development of the guillotine — a cutting machine that made practicable the fabricating of a variety of stone previously thought to be unusable." This machine has been a major factor in the increasing use of stone veneers for exteriors and interiors. It has made beautifully colored rock-face ashlar available in all parts of the country at a reasonable price to meet the demands of architects, designers, and decorators.

Developments and Research in the Sawing of Dimension Stone by Frank D. Hoyt and Howard L. Hartman of the Department of Mining, Pennsylvania State University, gave the results of experimental work on the sawing of slabs of slate directly from the solid in the quarry, and thus eliminating a second sawing in the mill. The conclusions of the authors was that results to date have been very promising when rotary and chain saws were used for cutting. These saws, they claim, are suitable for cutting other kinds of dimension stone in a similar manner.

Swedish Scientific Work Tells History of Explosives

A major contribution to the history of the manufacture of explosives—*Nitroglycerine and Dynamite*—has been published by Nitroglycerin Aktiebolaget, Gytorrp, Sweden. This company, which was founded by Alfred Nobel in 1864, was the first to manufacture nitroglycerin. Many documents from the firm's archives were made available for research in the writing of this book.

The work, written in Swedish, contains a complete English translation. The original manuscript was prepared by the late Dr. Sigurd Nauckhoff.

Ovar Bergstrom subsequently brought the original monograph up to date, added a chapter on safety, and included other pertinent information on modern developments in the manufacture of explosives.

The book is well illustrated with photographs and schematic drawings of various manufacturing processes.

British Equipment
Used in New Canadian Gravel Plant

By WALTER E. TRAUFFER

THE Canadian sand and gravel industry is so monopolized by American and Canadian manufacturers that a plant using British machinery is unique and, in a way, refreshing. The plant referred to is that of the Telephone City Gravel Company Ltd., Brantford, Ont. It is a new 250-t.p.h. operation built alongside and around an older and smaller plant. All the new equipment, from the pit to sand classifiers and loading bins, was brought from Great Britain as a unit. It is planned to import additional sand-processing equipment.

As might be expected, this company is British-owned and operated. How this came about is an interesting story. The 500-acre deposit, a highly regarded one, was first opened to supply aggregates to the new Peace Bridge at Fort Erie and Buffalo.

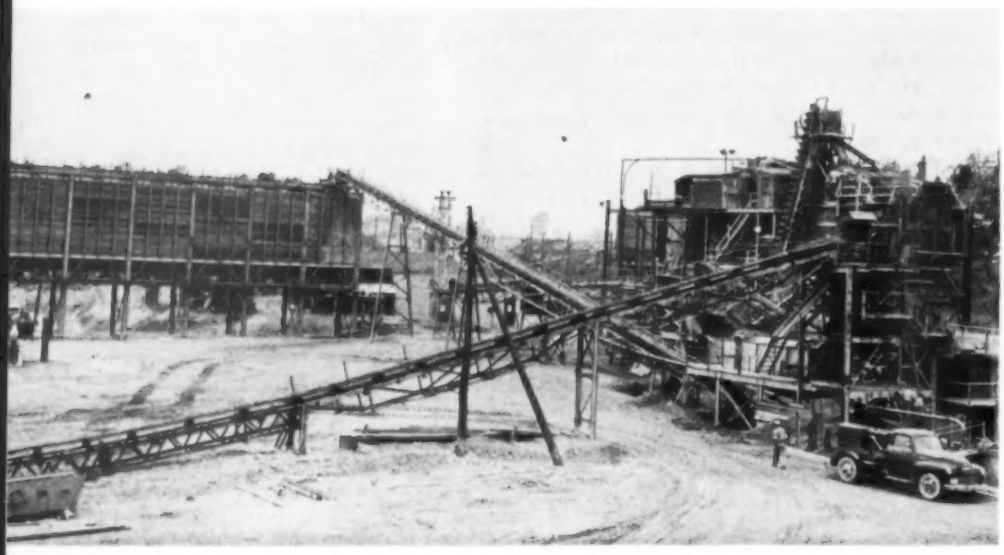
In the fall of 1956, Harold Needler, an English gravel producer who had been investigating gravel properties in Ontario which had been recommended by English agents, called on geologists in Toronto and asked them where the best gravel could be found in Ontario. He was told that some of the best gravel was found in Brantford. He promptly purchased the existing holdings from the Telephone City Supply Co., along with other adjacent land. Mr. Needler changed the name to the Telephone City Gravel Co. Ltd., and began planning to reorganize, and rebuild the old plant, which had limited sizing facilities and a capacity of only 150 t.p.h.

In September, 1957, E. Noel North, an experienced operator with a background of 30 years in the gravel industry in England, who was general manager and director of the Hoveringham Gravel Co. Ltd., was brought over to carry out these plans. The English-made processing plant was put into operation in May, 1958, and was arranged to handle natural gravel or mixed, as desired. It was erected alongside the old plant and was arranged so that the old plant handles crushed gravel exclusively. Under the new management, the company increased its production 300 percent.

The demand for totally natural gravels is growing rapidly in this area, and the uniform particle shape of the material lends itself well to this demand. Another feature is the fact that now the chips are chips, and no "rounds" find their way into this particular product.

The pit working face averages 60 to 70 ft. in height and is a glacial bank consisting chiefly of dolomitic materials. It averages 65 percent gravel and 35 percent sand. A typical analysis, taken recently, shows very little retained on 4-in.; 43 percent between 4-in. and 1-in.; 29 percent from 1-in. to No. 4 sieve.

Below the present pit level there



A general view of the plant, with the conveyor from the pit in the foreground. At the right are the old crushing plant and the new scalping and washing installation. New bins, with screens above, are at the left.

36-ft. long screen conveyors, cone sand classifying tower featured

is about 30 ft. of similar material, and under this is an undetermined depth of minus 48-mesh sand which the management plans to use. Equipment is being built in England for the blending of this fine sand with the regular bank run material, so that all grades of Canadian specification materials can be produced.

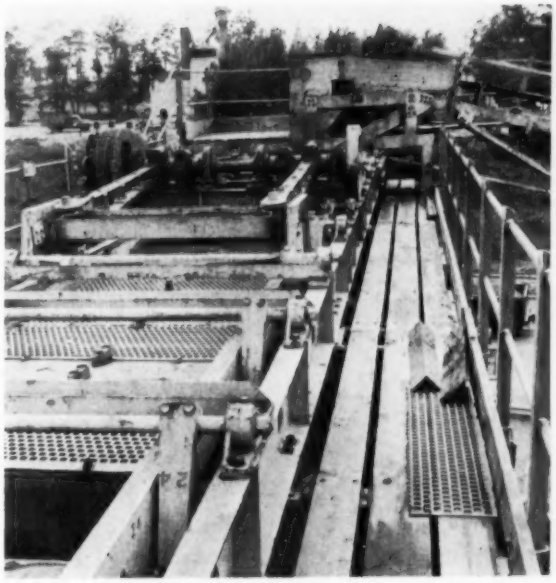
Overburden, averaging 2 ft. in depth, is being removed from the deposit by a TD 24 tractor with a 15-cu. yd. scraper, and the deposit is being worked by a Ruston-Bucyrus 54 diesel crawler dragline; this unit has a 70-ft. boom fitted with a 2¼-cu. yd. Ruston bucket. This setup works from the top of the bank and loads trucks in the pit with the minimum of lost motion. As each load requires only 8 to 10 ft. of wind and a very short turn, this machine can load up to 700 t.p.h. At present, two 21-cu. yd. (English) rear-dump quarry trucks are used to haul the material about 1,000 ft. to the plant receiving hopper.

Wash water is taken from the Grand River, 3,000 ft. distant and 80 ft. below the present pit level, and a 6-in. Canadian Allis-Chalmers CM 2-stage pump and a 3-in. Ingersoll-Rand pump supply the plant with up to 60,000 gallons (Imperial) of water per hour, if necessary.

About 350 t.p.h. of pit run material is fed from the receiving hopper by a 3-ft. conveyor to a 5- by 14-ft. Niagara E10 screen. Here all minus 1¼-in. material is scalped out and fed to a 4½-ft. diameter Seely rotary washer completely lined with Linatex rubber and fitted with sand screens on both the inlet and discharge end of the washer.

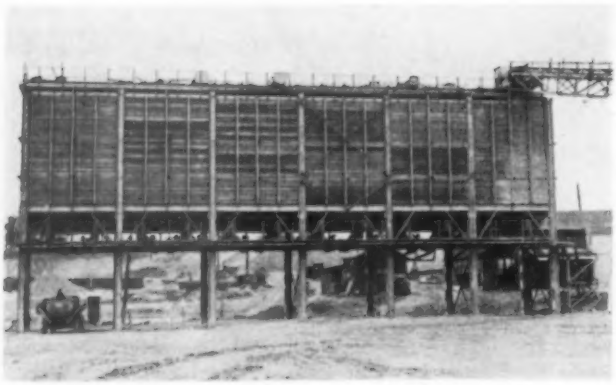
After scrubbing, the natural gravel is automatically fed by gravity to a 24-in. belt conveyor to two 36-ft. long Super Spartan reciprocating screen conveyors, in series—the first

The 2¼-cu. yd. crawler dragline loading one of the 21-cu. yd. trucks from the bank. Both are British made.



The two 36-ft. long reciprocating screen conveyors used for sizing uncrushed gravel. Each can make up to five sizes and one over the end, all going directly to the bins.

The scalping screen and rotary scrubber which channel material three ways—to the old crushed gravel plant, to the uncrushed gravel plant, and to the sand plant.

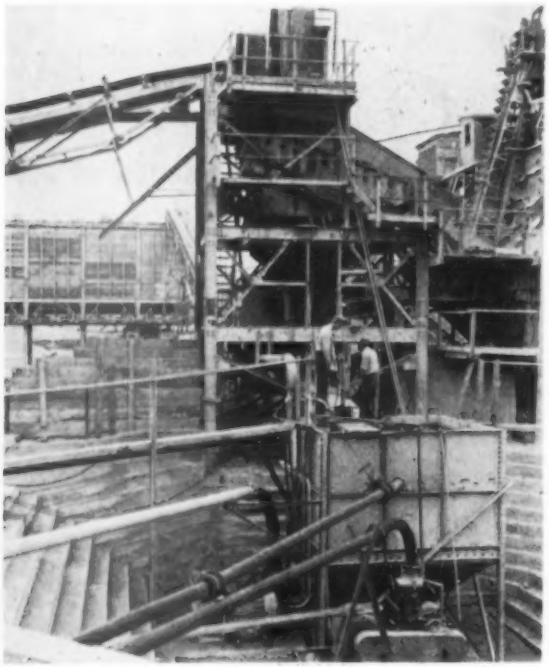


Above: The bin structure under the gravel screens has ten 100-ton compartments. A belt conveyor below makes it possible to load out any desired blends.

Right: On this sand classifying tower two pipelines discharge sand and water into a boiling box, from which it is split to two cone classifiers.

one 5 ft. wide, the second 4½ ft. wide. These were made by Robert Cort of Reading, England. As many as five sizes can be made through each screen and a further size over the end. These screens are equipped with Tuftex perforated plate (made by Lockers, Warrington, England). As this plate is only 1/16 in. thick, compared with the traditional ⅛-in. mild steel plate, it vibrates sufficiently by this natural action to prevent blinding.

The bin structure supporting the Super Spartan screens consists of ten compartments of 100-ton capacity each, and a belt conveyor under the bins makes it possible to blend gravels to almost any specification. At the end of the belt, before discharge, the gravel is fed over a vibrating rinsing screen. This both eliminates "sandwiching" by thoroughly remixing, and rids the gravel of any bin slime that may be present. When the material eventually enters the truck or rail car, it is a highly polished aggregate. Side gates are used for loading material out to stockpile.



Left: Sand from the washer (background) goes to this tank, where water is added, and is then pumped to the sand classifying tower.

The plus 1¼-in. gravel is fed by gravity from the scalping screen to a 36- by 24-in. Pioneer jaw crusher, followed by a Nordberg coarse bowl crusher and a 3-ft. Nordberg fine crusher. The gravel is then fed by gravity to an elevator, which carries it to the top of a set of six bins, where four screens, working in pairs, size and rinse the material. These hoppers are located over a railroad, so the material can be easily and quickly loaded into rail cars.

The sand stripped out at the washer goes to a sand tank of unusual design, where water is added at the rate of 60,000 g.p.h. Two Linatex rubber-lined pumps—one 5 in. and one 6 in.—suck up the sand in suspension and feed through two pipelines to the top of an 80-ft. steel tower. There both lines discharge into a common boiling box, from which the sand is split to 4½-ft. diameter Prior cone classifiers (with their balances slightly differ-

(Continued on page 92)

Five-Year Research Program Outlined at N.B.C.A. Convention

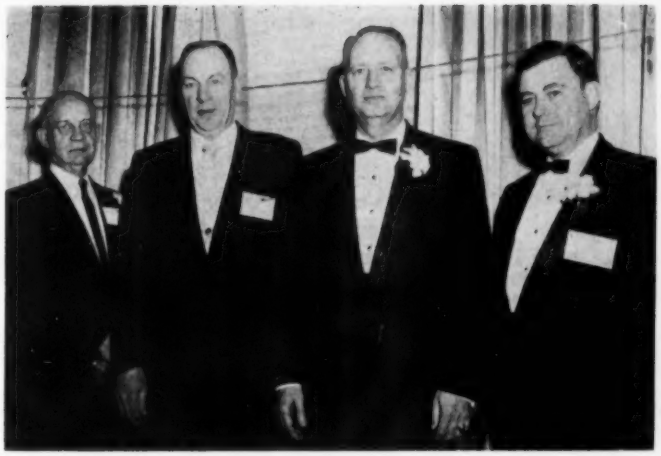
AT THE fifth annual meeting of the National Bituminous Concrete Association held recently at the Sheraton Cadillac Hotel in Detroit, Mich., a large segment of the nation's asphalt industry implemented a $1,300,000 research program which is to be spread over a five-year period.

Bryant M. Collins, president, Collins Construction Company, Austin, Tex., was elected president of the association by the 600 delegates. Other officers elected included: F. C. Leffingwell, Asphalt Paving Company, Miami, Fla., vice-president; Allen Snyder, Hefler-Snyder Company, Garwood, N. J., treasurer; and Stan Watkins, Bituminous Surface Treating Company, Invergrove, Minn., secretary.

President-elect Collins stated that for the first time in the history of the country a group of paving contractors has undertaken to do their own research, rather than depend on Uncle Sam to do it for them. The research will be directed primarily toward improving the quality of materials and workmanship in bituminous construction. The association will also attempt to do its part to improve the caliber of the engineering profession in the field of pavements through a series of nationwide scholarships.

Another important phase of the national program will be a co-ordination of efforts with the 26 state asphalt paving organizations also engaged in similar research.

In his progress report to the N.B.C.A., Dr. J. E. Buchanan, president of the Asphalt Institute, urged that a consistent policy of realistic competition between pavement types is necessary. Asphalt's potential importance to our big highway program lies, he said, in the part it can play in helping the nation get the roads we need in good time and within our ability to pay for them.



New officers of the National Bituminous Concrete Association: Allen Snyder, Hefler-Snyder Co., Garwood, N. J., re-elected treasurer; Stanley S. Watkins, Bituminous Surface Treating Co., Invergrove, Minn., secretary; Bryant M Collins, Collins Construction Co., Austin, Tex., president; and John W. Kelly, Imperial Paving Co., Oklahoma City, past-president. F. C. Leffingwell, Asphalt Paving Co., Miami, Fla., re-elected vice-president, was absent because of illness.

Dr. Buchanan also asked for a policy of stage construction which would consist of building at a given time only that part of the facility for which both the funds and the need exist.

At the second general session the subject was *Manufacture, Production, and Laying of Bituminous Concrete Pavements.*" H. A. Radzikowski, chief, Division of Development, Office of Operations, Bureau of Public Roads, was moderator.

In his opening remarks, Mr. Radzikowski stated that a subject of interest to the entire group is the problem of mixing time of bituminous concrete. This problem, he said, was emphasized at the Miami meeting.

"For batch-type plants our analysis of standard construction specifications show that dry mixing is a requirement in 27 states," he said. "The variance in minimum requirements is from 5 to 20 seconds, or a difference of 300 percent. Minimum wet mixing time is a requirement of 48 states and varies from 20 to 60 seconds, or a difference of 200 percent. The higher mixing times appear to be 50 to 100 percent greater than is required by a modern plant to produce a quality mix.

Mr. Radzikowski said his group had been requested by the Bureau of Public Roads to develop a definition of bituminous mixing time for the consideration of public highway departments and the bituminous paving industry.

At the Tuesday morning session Howard E. Hill of the Michigan State Highway Department outlined the state's road construction program for bituminous concrete. During 1960, he said, the state has

National officers and directors of N.B.C.A. for 1960. First row, left to right: Sheldon G. Hayes, Cadillac Asphalt Co., Detroit, past-president and ex-officio member of the board; C. B. Wuertenberger, Rea Construction Co., Charlotte, N.C.; W. T. Milam, Central Contracting Co., Ada, Okla.; Allen Snyder, Hefler-Snyder Co., Garwood, N.J., national treasurer; J. A. Woodworth, Woodworth & Company, Inc., Tacoma, Wash.; C. E. Buchanan, Bituminous Products Inc., Buffalo, N.Y.; and Paul R. Anderson, Standard Asphalt and Tar Co., Charleston, W. Va., chairman, N.B.C.A. board of governors.

Second row, left to right: Edward T. Perry, New Haven Trap Rock Co., New Haven, Conn.; G. C. Fluty Jr., The Allen Company, Inc., Winchester, Ky.; John W. Kelly, Imperial Paving Co., Oklahoma City, immediate past-president and ex-officio member of the board; W. H. Ford, J. R. Ford Co., Lynchburg, Va.; and Howard Bridges, Bridges Paving Co., St. Louis, Mo. Other members not in the group: Bryant M. Collins, Collins Construction Co., Austin, Tex.; F. C. Leffingwell, Asphalt Paving Co., Miami, Fla.; F. W. Megarry, Megarry Brothers, St. Cloud, Minn.; and Ward T. Miller, BlackTop Materials Co., Sun Valley, Calif.

programmed 300 miles of new limited access interstate and arterial highway construction. Some of this will be new construction and some will be reconstruction and resurfacing.

Mr. Hill said that Michigan will award many miles of asphaltic concrete surfacing for interstate highways in a package program which will require that the prime contractor provide grading and drainage, as well as the surfacing.

John C. Mackie, commissioner, Michigan State Highway Department, told the group that Michigan has only six miles of asphalt expressway in operation.

"We are now embarking on an accelerated program in the use of this pavement type on an unprecedented scale," Mr. Mackie said. "I know that as an industry you are making a genuine effort to benefit the highway user, and in Michigan we readily recognize the economic desirability of your product."

Sheldon Beanblossom, executive vice-president of the Minnesota Bituminous Pavement Association, in the session on public relations and safety, outlined what individual contractors are doing to promote good will and also asphalt paving. He cited several Minnesota paving contractors who had initiated a roadside billboard campaign to promote the economy of asphalt. He stated that all the activities of the asphalt paving indusry must be in the public interest, and that its purpose is to give the public greater value for its investment in road construction.

In its report to the association, the Quality Improvement Committee outlined its program for the next four years. The plans for 1960 call for ten projects. Top priority will be given to a literature survey to provide material for interested researchers. In the improvement of asphalt cement, project members will study the characteristics of the material from the standpoint of slower loss of life in the mixing cycle, more resistance to fatigue cracking, and better resistance to displacement of the asphalt from the aggregate by water.

Other studies on the agenda will be a compilation of a design manual which will translate the research done by the Corps of Engineers on heavy-duty airfield pavements into a form suitable for highway construction. Improved riding quality, the effect of aggregate coating in hardening of asphalt cement, and other supporting studies are also scheduled for this year.

At the first general session on Monday morning, Michigan's governor G. Mennen Williams, and Mayor Louis C. Miriani of Detroit welcomed the group to the city.

Senator Patrick V. McNamara, chairman of the Senate Subcommittee on Roads, outlined the saving of lives made possible by limited access highways. Another significant fact involved in the nation's highway program, the speaker said, is that for every $1,000,000 spent on highway construction, 60 on-site jobs are created annually; and for every 100 on-site jobs, 12 off-site jobs are created.

At present, 5,000 miles of interstate highway have been completed, 5,000 more miles are under construction, and another 18,000 miles are in the planning stage, according to Senator McNamara.

The sixth annual convention of N.B.C.A. has been scheduled for the Shamrock Hotel in Houston, Tex., January 30 through February 2, 1961.

How's Your Credit Rating?

it may be the difference between the survival or failure of your operation

By ERNEST W. FAIR

BORROWED money is becoming more and more important as the nonmetallic minerals industry grows; so the problems of credit are assuming increasing importance to every member of the industry, whether he has a large operation or a small one.

Good credit has very definitely become a "must" considering today's increasingly complex and technical methods, accounting systems, and tax laws. Sound financing arrangements and good credit are very important for the successful operation of any business enterprise. For financing of accounts payable, operations, supplies, materials, equipment, or real estate, nearly every firm needs some credit in one way or another. A good credit rating, therefore, becomes a valuable asset.

A consideration of the basic essentials of establishing and maintaining a good credit rating may be in order. A number of bank executives who were consulted on this subject have given the opinions and suggestions which follow.

Wise past use of credit—Credit is essentially a field based on experience. Decisions are made in great measure on what the record shows for the individual involved. The record which he has built up through the years will be of utmost importance at the crucial time.

In the case of the business man whose firm has never employed such credit to any extent and for whom, therefore, no record exists, the lending agency will make a most careful examination of his personal credit experience.

For that reason the wise use of credit always lays the foundation for whatever credit needs one may have in the future.

A good reputation for honesty—This factor is another top-of-the-list consideration in the granting of business credit. Lending and credit agencies today recognize that there can be extenuating circumstances which bring about lapses in repayment records for an individual or a business firm.

If the records show that one has been honest during such times, it is a matter of considerable importance. In all credit grants of any kind security of repayment is uppermost in minds of those in the agency who decide for or against an applicant. The reputation of the individual involved helps seal that security factor—or detracts from it.

Business conducted on a sound economic basis—Good business practices determine whether or not a businessman has a chance for success in the future. If he needs credit to build on credit already established he will usually get it.

However, if the records show the business experience of an individual is the direct opposite, credit risk then becomes dangerous. There is little likelihood that the man who has not in the past operated his business on a sound economic basis will do so later, although he may obtain more money to work with.

Establishment of a good credit rating depends in large measure on a demonstrated record of such experience. An applicant can be very certain that one of the questions asked when he seeks credit will be an inquiry as to his credit rating. Such an inquiry is usually not made directly but through outside investigation.

Good equity — The better one's equity is in a business, the better credit risk he becomes, for two reasons: (a) he has something definite of a material nature upon which to secure the credit; and (b) he has such a large personal interest in his enterprise that he will probably not

(Continued on page 94)

Consider COMPENSATION Cost

Case histories suggest checking for unsuspected fire-danger spots in your plant.

By A. B. HOFTIEZER
Vice-president in Charge of Safety
Laverack & Haines, Inc.
Buffalo, N. Y.

IN DISCUSSING the matter of fire hazards with a number of people in the stone crushing and similar industries, we encountered many who do not believe that they have much of a fire hazard. Cement and gypsum people, on the other hand, have had some unfortunate experiences and are aware of the hazards.

In checking through our accident records, and from experiences that have been observed, we find many instances of fire and many possibilities, even in stone plants. No great property loss was incurred, a fact which led us to believe that perhaps our greatest loss from fire is to *people*, rather than to property.

For instance, we have had at least three men burned, one of them fatally, when their clothing was ignited by salamanders or open fires. We have had men burned trying to put out small fires. The loss in these and other cases, plus the misery and agony involved, would indicate a real need to check for fire hazards.

I recall seeing a card in a hotel room some time ago that stated, "Our hotel is fire-proof—you are not!" Perhaps this is the slant we need to take in exploring our plants for fire hazards. The following points should be of help in making such an exploration.

Electrical wiring in some plants is often found to be unsafe. Sometimes this is due to the fact that repairs and even installations are made by unqualified and untrained persons, or because temporary wiring has not been converted into adequate and safe permanent wiring.

Housekeeping in oil houses is often very poor. Rags are piled in corners and valves leak oil on the floor. In many instances oil houses are also used for storage of other combustible material. The position of the fire extinguisher should also be checked. It should be close to the door, so that in the event of fire the occupants are between the fire and the exit. Extinguishers are often hung at the back of the oil room: in case of a fire, men using them could very well be trapped. The excuse for hanging them at the back of the oil room that is sometimes given: "to prevent freezing, as the area closer to the door is colder in the winter."

Gas pumps should be regularly checked. Although a gasoline pump may be located outside a building, if it is near an open door, vapors can float into the building and ignite sparks from a welding torch or an open fire. This was illustrated by an incident in Baltimore. A lift truck was being refueled from a pump outside the building. Fumes drifted into the building and into a washroom, where they were ignited. Two men were burned.

Gassing up shovels and portable air compressors in areas removed from gas pumps should be done with extreme care. Several years ago at one plant a common rubber hose was used to pump gas from a 50-gal. drum carried in a dump truck to a shovel in the quarry. Static electricity ignited the gas, and only the quick action of the shovel operator and the truck driver, who drove away from the shovel, prevented the loss of the truck and possibly saved two lives.

Transit-mix trucks that are being gassed up sometimes are left with the mixer motor running. This is bad practice, and should be avoided.

Gasoline is often used for washing parts and is then left standing in open buckets or trays between cleaning operations. There are many solvents not as dangerous to use as gasoline. Even these, however, should not be left in open receptacles. Covers should be provided, and these should be kept in place when not in use.

Welding has caused many casualties. For some reason, the idea persists that if gas is washed out of a tank with water, it is safe to weld on the tanks. Every year people are injured by explosions in these tanks. Even a fairly light oil will leave enough residue, so that if some one tries to cut the top off with a cutting torch, there is an explosion.

Propane has also caused explosions. In one case a torch used for thawing sand out of a hopper was brought in at the end of the day and placed in a locker. Either the valve was not closed, or it was struck and opened. As a result, the gas (as a vapor) leaked out and flowed across the floor until it reached the height sufficient to be ignited. A watchman who was in the tool shanty at the time received severe burns to both ankles and legs.

Another accident occurred when the valve was opened and not immediately ignited. The gas built up; and when the match was struck, a flame spread about 20 ft. across the floor and ignited some clothing, but fortunately it did not cause any injury or a serious fire. Since propane is heavier than air in a vapor form, it will settle to the floor, and will flow almost like water. It will find

a Fire Loss

One of the features of the recent National Safety Congress was a talk on "A Fire Hazards Program" by Alfred B. Hoftiezer. At our request, he revised and expanded his address, which we present under the title "Consider Compensation Cost a Fire Loss." Mr. Hoftiezer is well informed in all phases of industrial safety by his many years of experience as vice-president in charge of safety for Laverack & Haines, Inc., insurance brokers of Buffalo, N. Y. This firm handles many large industrial accounts in the nonmetallic minerals business and other industries. An earlier article by Mr. Hoftiezer—"Practical Aspects of Noise Control in Crushed Stone Plants"—was published in the May, 1955, issue of PIT AND QUARRY.
—The Editors

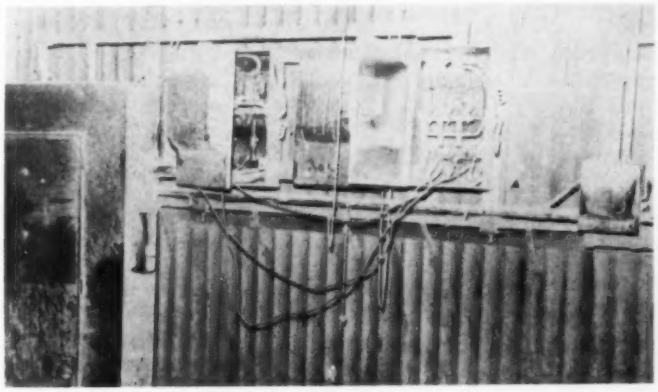
low spots and collect there, awaiting some form of ignition to set it off.

Because oxygen and oil, when combined under pressure, can ignite spontaneously, this fact should be brought forcefully to the attention of employees, particularly welders. The storage of oxygen tanks in an oil shed or in proximity to oil barrels should be prohibited. When a welder is through with his oxygen and acetylene hose, he should make sure it is not stored in an area where oil can be spilled on it or where it can soak up oil from puddles on the floor.

"Little dog houses" that men erect for themselves from powder boxes, sheet metal, or tar paper can also be a source of fire. We find papers and magazines in large quantities in these dog houses, which, combined with makeshift electric heaters, plus old clothes and rags—and sometimes oil cans and grease cans—set up a fire potential that is about the worst imaginable. Most superintendents ignore these little shacks and do not look inside to see what the conditions are. If a man should go to sleep in one of them, he could possibly be burned to death.

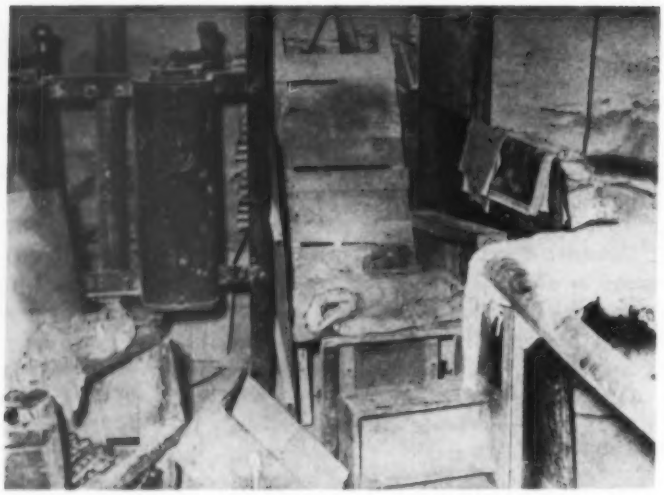
Improvised lampshades are often used by workmen, who put them together with paper. These are hung directly on the light bulb. Considering the heat generated by these lamps, and the condition of the paper, which is usually dried out, the possibility of fire becomes a certainty.

Starting up oil-fired kilns or driers may be another source of burns and possible fires. After two men had been burned by backflashes, we began recommending the use of



Some "temporary" wiring that unfortunately was never converted into a safe, permanent hook-up.

This is a typical "doghouse," put together out of odds and ends for the protection of workmen from the weather.



The interior of another "doghouse." This one has an electric heater under the chair.

shields, and in several plants shields have been put up, made either of plastic or of glass from an old windshield. These permit the operator to light up the furnace and give him protection for his face and eyes; but, even with these safeguards, there may be burns on the hands occasionally.

Fire hoses are sometimes used for clean-up purposes. This practice can lead to storage of the hose after such use in other than the designated area. It also tends to wear out the hose and weaken it because it is not hung up and dried out. If it is necessary to wash down, we suggest that standard rubber hose be used for this purpose, and that the fire hose be kept for fire fighting only.

High-tension wires also present definite hazards. Personnel should be told never to direct a stream of water from a fire hose toward high-tension wires or transformer enclosures. If this instruction is not completely understood, the fire may be extinguished, but at the cost of two or three lives. It is not a good idea to depend on a fog nozzle to overcome this hazard, unless there is *always* sufficient pressure.

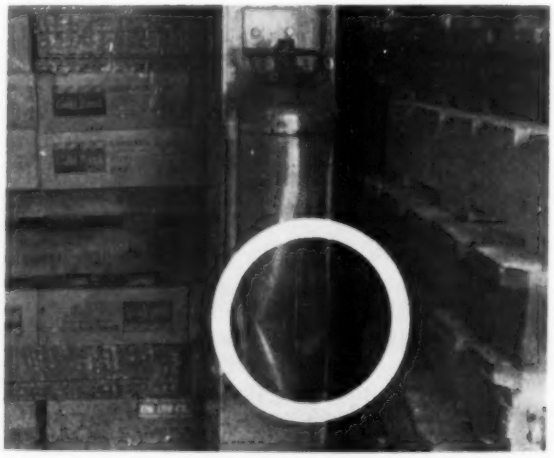
All fire extinguishers in vehicles should be checked to make sure that they are in good operating condition. About two years ago we had a truck that was backed too far on a stockpile. When it came to rest at the bottom of the stockpile, escaping gasoline was ignited by the motor, and it began to burn, while the driver was still in the cab. The driver of a pick-up truck a short distance away grabbed his fire extinguisher and put out the fire; the first driver suffered only minor burns. Investigation at the time of the accident disclosed that the extinguisher in his truck had been removed.

In painting trucks and equipment, workmen sometimes use spray-guns without proper ventilation and without regard to the explosive possibilities of paint thinners. This operation usually occurs during the winter months, when doors and windows are closed. When there is no ventilation, an explosive or flammable mixture is readily created. The toxicity of these thinners may be an additional hazard.

Automatic heating units may also cause trouble. Once installed, they are too often ignored. A regu-

"Lampshades" made out of paper and/or rags, placed directly over the bulbs, as seen in this illustration, are certain to burst into flame sooner or later.

This beat-up fire extinguisher is all charged and ready to be used; but only an ignorant (or desperate) person would dare to use it.



lar maintenance program, carried out by authorized and qualified persons, should be instituted.

Clothing saturated with oil and grease invites trouble. In one instance a maintenance man suffered serious burns when his oily clothing was ignited by a cutting torch. We also traced one costly case of dermatitis to this source. Perhaps a program of laundering work clothes should be considered.

The area around a powder magazine should be regularly checked, despite the fact that some powder men feel that keeping this area clear is not their responsibility.

Soda - acid fire extinguishers can blow up during use. Hydrostatic testing at prescribed intervals is therefore recommended. Many extinguishers charged and ready to use become dented or otherwise badly damaged. We recommend that whenever the damage to the case is severe, so that it has been distorted in any way, the extinguisher be replaced.

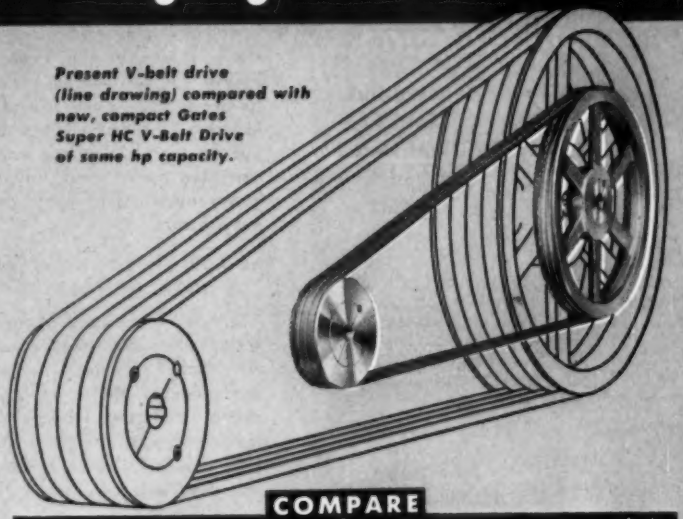
These are by no means all of the possibilities for preventing fires that may start in a plant; but perhaps the suggestions will indicate where to look for unsuspected fire hazards.

Because of the nature of the business, our plants do not require so many wooden structures as other factories. However, we still might find that if we add to our fire cost the compensation costs due to small fire incidents, we might learn that the overall loss from fire is much greater than we think.

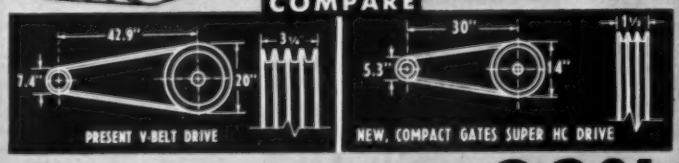
With good housekeeping, well maintained fire protection, and tight control over the use and storage of flammable materials, we should be able to make fire hazards a minor problem of our operations.

Financing was recently completed for the plant construction now under way in Albuquerque, N. M., by American Gypsum Company. Company officials have received a check for more than $3,000,000—proceeds from a public securities offering by the new firm. (See PIT AND QUARRY, August, 1959, p. 26.) The gypsum products plant is expected to be completed late this summer.

Designing NEW DRIVES?



COMPARE



Save up to 20%

with new high capacity V-belt drive

When you change the whole drive — both V-belts and sheaves — remember: The cost of a Gates Super HC V-Belt Drive is as much as 20% less than the cost of present V-belt drives of the same horsepower capacity.

A development of Specialized Research in the world's largest V-belt laboratories at Gates, the new Super HC V-Belt makes possible the most compact, lightest-weight, lowest-cost multiple V-belt drive you can put on any machine!

Cuts drive space as much as 50%

With Gates new Super HC V-Belt, sheave diameters and widths can be reduced 30% to 50%, center distances 20% and more. Bearing load is lightened and total space occupied by the drive may be cut as much as 50%.

"The Modern Way to Design Multiple V-Belt Drives" is an informative handbook on the Super HC Drive, available from your nearby Gates Distributor listed in the Yellow Pages of your phone book.

The Gates Rubber Co., Denver, Colorado

Gates Rubber of Canada Ltd., Brantford, Ont.

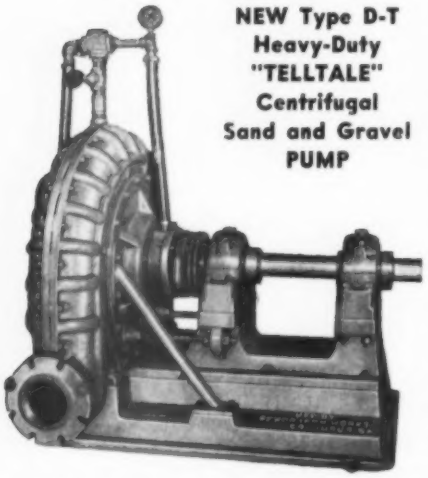
World's Largest Maker of V-Belts

TPA 439

Gates SUPER HC V-BELT Drives

Enter 91 on card, page 233

LOOKING FOR A BETTER SAND AND GRAVEL PUMP?



NEW Type D-T Heavy-Duty "TELLTALE" Centrifugal Sand and Gravel PUMP

Have a look at the Type D-T Heavy Duty "Telltale" Pump. Its production is the talk of the industry wherever it has been put to work. Likewise, what it can take under what would be heavy overloading for an ordinary pump.

AS LOW IN DOWNTIME AS IT IS HIGH IN PRODUCTION

"Telltale" is the only pump that warns when it's time to reline. Air sucked through periphery ports causes pumps to lose its prime. Pumping stops. Water leaking through the ports signals that the shell liner and the surrounding belt of packing have worn through.

Available with either tough semi-steel or best-in-the-long-run Ni-Hard wearing parts in 4", 6", 8", 6 x 8" suction and 8 x 10" suction. Now available also in either alloy, 45 and 90° extra-heavy long-radius flanged elbows. Write for Type D-T Heavy-Duty folder and prices.

Pekor Iron Works, Inc.

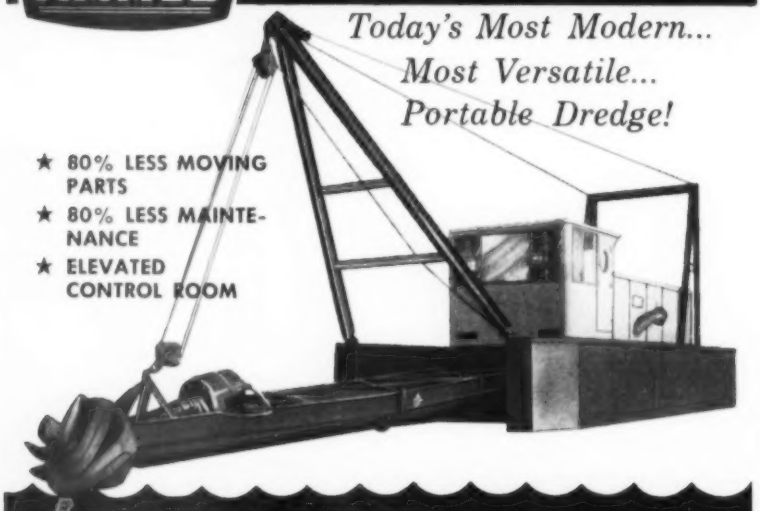
ESTABLISHED 1892

LOCK DRAWER 909 FAIRFAX 2-4020 COLUMBUS, GEORGIA

Enter 92-A on card, page 233

AMMCO PORTABLE DREDGES

Today's Most Modern... Most Versatile... Portable Dredge!



★ 80% LESS MOVING PARTS
★ 80% LESS MAINTENANCE
★ ELEVATED CONTROL ROOM

★ ONE-MAN PUSHBUTTON CONTROL
★ POWERFUL HYDRAULIC DRIVES ON CUTTERHEAD AND WINCHES

AVAILABLE IN SIZES 8" TO 22"
MANUFACTURED IN THE UNITED STATES AND EUROPE

AMERICAN MARINE and MACHINE COMPANY
P.O. BOX 1150 ● PHONE AL 5-0709 ● NASHVILLE, TENNESSEE

Enter 92-B on card, page 233

New Canadian Plant

(Continued from page 84)

ent) which produce two grades of sand for concrete and asphalt.

Because the cones are on a high tower, the stockpiles can be built up to almost 50,000 tons each, with no additional handling; and because of the large stockpile, the sand has a controlled moisture content of 2 percent, which is an advantage in ready mixed concrete plants, where cement-water ratios are important.

Water overflowing the cones contains less than 1 percent of fine sand, which goes to a series of secondary ponds. After the clear water has been reclaimed, the remainder is allowed to run back to the river after going through a further set of slurry ponds.

There is a steady demand for minus ¾-in. granular "A" gravel suitable for base under asphalt pavement. The company can now produce this material through the crushed stone plant by limiting the controlled percentage of sand to remain with the crushed gravel over the original scalping screen and diverted past the crushers, then mixed back with the crushed gravel, including the dust, in the elevator buckets. This material is in considerable demand as all the round gravel has been taken out; it is a great improvement over the former method of producing "A" gravel.

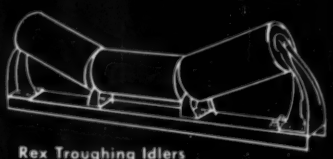
Plans for further expansion in 1960 include a second classifying tower incorporating a 6-ft. diameter gravity cone which will permit the production of a washed plaster and mortar sand.

Rehandling of all materials in stockpiles and reloading to trucks for shipment is done with a 2¼-cu. yd. Lima clamshell crane with a 70-ft. boom and two 3-cu. yd. Hough Payloaders.

E. Noel North is now president of the Telephone City Gravel Company Ltd., and Jack Smith, a vetern from the Dunkirk Beaches, employed since the war by the Air Ministry in England, is plant superintendent. Sales are organized by another war veteran, Don Oxley, who has had diversified experience in the gravel trade. He is now sales manager. Crawford Reid is accountant.

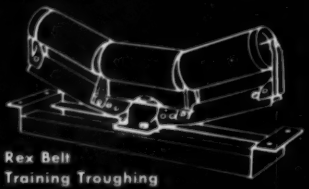
REX® Conveyor components

Complete line of idlers and pulleys Rex-Rated for every type of service



Rex Troughing Idlers

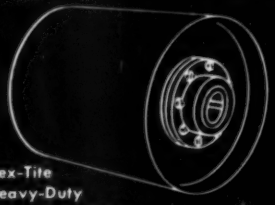
Rex Return and Flat Idlers



Rex Belt Training Troughing Idlers

Rex Impact Troughing Idlers

Rex Spiral Return Idlers



Rex-Tite Heavy-Duty Conveyor Pulleys

Rex Taper-Lock Normal-Duty Conveyor Pulleys

to the salt mines...FOR LIFE

There's just one reason why Rex-Rated Idlers were sent to the salt mine shown above...International Salt Company knew in advance that these idlers would provide maximum service life under punishing corrosive conditions and continuous heavy loads. Years of service have proved the decision was right. Down time has been kept to a minimum.

The main reason why Rex-Rated Idlers eliminate guesswork and costly selection errors is because the Rex-Rated line is complete with idlers for every application. And every Rex Idler is accurately rated to provide exactly the operating life required under specific operating conditions. A simple selection chart tells you in advance exactly which idler you need and what kind of service to expect before you buy.

The Rex Rating System and the Rex line are the results of years of experience in idler design and testing by Rex Engineers.

Why risk costly errors? Specify Rex-Rated Idlers. Write CHAIN Belt Company, 4604 W. Greenfield Ave., Milwaukee 1, Wis. In Canada: CHAIN Belt (Canada) Ltd., 1181 Sheppard Ave. East, Toronto.

REX®

CONVEYOR SYSTEMS AND COMPONENTS

Your Credit Rating

(Continued from page 87)

default on credit granted to him.

A man's credit position is in direct proportion to the percentage of equity in this business operation which he can build up.

Adequate records — There are many reasons why a plant operator should keep complete and accurate records of his business operation; and maintenance of his credit rating history is definitely one of these factors.

Such records must be complete and thorough. The more detailed and accurate they are, the better the picture of his business operation will be, and the more confidence others will have in his ability as a business man.

Such records not only provide specific and factual information for use of credit when it is needed, but demonstrate business ability, which is an essential requirement for good credit ratings in all fields.

Specific knowledge of modern methods and applying them insofar as possible also helps establish a good credit rating. The individual making an investigation may know next to nothing about the nonmetallic minerals industry; but if he is a good credit man, he can easily ascertain the position of the firm in this industry.

Doubt and suspicion arise when he finds such an enterprise falling behind its competition. He knows from experience that a business in this position has only a minute chance for success.

Detailed and sound planning of what is to be done with the credit sought in the specific business is also of importance. The man who carefully outlines exactly what he proposes will find credit much more accessible than the one who makes an application with only vague plans for its use.

Ratings with commercial agencies also have definite value. Those who have used credit only in a small way in the past have often shrugged off these agencies or declined to co-operate in such listings. This can be a mistake. Being listed with a credit agency is just one more facet of establishing a written record which can be consulted by the individual from whom credit is sought.

Maintaining a good cash balance in a business operation is also important in holding a high credit rating. The business which may be in a bad cash position, although advanced credit is to be used for a good purpose, may be a bad credit risk under many circumstances.

For very obvious good business reasons it is always wisest to maintain a sufficient cash balance in a business. It is equally sound policy to plan for its continued maintenance. For example, if a plant operator should seek $10,000 of credit to make a $15,000 purchase, at the same time using $5,000 of his own funds, the application may appear questionable if the cash balance at the time is only $5,500. In all probability the credit could much more readily be obtained for $12,500, for this would leave him with a $3,000 cash balance after the purchase.

Sound repayment plans are always essential. When major credit grants are sought for business purposes, it is always wise to develop a detailed program for repaying the amount borrowed. This schedule should never be based on hoped-for additional business profits to be made from expansion, for example, but on *present business income*.

Past payment records on all types of obligations always help to establish a good credit rating for any business man. These include everything from the smallest to the largest monthly bills the applicant may have been running with suppliers. They also include past credit grants.

A long record of prompt payment of bills (and taking of discounts wherever available) is an excellent part of a good credit record.

The foregoing factors represent the basis for establishing a good credit rating—and keeping that position until it is needed. Others can, of course, be added, for the more assets of a positive nature the individual has at his command, the finer that rating will be when it seems a good policy to use credit profitably in the operation of a business venture.

Men of the Industries

(Continued from page 67)

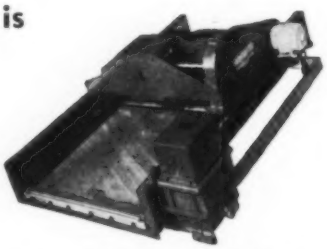
plant at its present location at Butler. As the demand for aggregates grew, the firm was producing more rock than lime. From a small two-unit portable plant the firm has been growing continually, and in 1952 a ready-mixed concrete plant was added. Mr. Alvis now operates three rock-crushing plants in Vernon and Cedar counties.

After attending the University of Wisconsin and serving in the Army Air Force, Mr. Alvis was a machinery dealer and salesman for some years. He also helped design and perfect a hammermill crusher for a leading manufacturer.

Mr. Alvis was one of the founders of the Missouri Limestone Producers Association and is now serving on the board of directors after a term as president in 1954. He is a Rotarian, president of the Butler Chamber of Commerce and also president of the Butler Country Club. His hobbies are golf, swimming, and fishing.

The Leahy® Screen is the One for You

When it comes to the screening of difficult, damp materials such as lime, ag-lime or silica sand, the Leahy Screen with integrated FlexElex® heating is easily the one you find most profitable. The FlexElex heating unit is not an attachment—it is fully integrated, eliminating the use of bothersome flexible connectors. No hot wire screen combination compares with the Leahy Screen for efficiency. Send for Bulletin 16-EH.



Made by the Original Deister Company Established 1906

THE DEISTER CONCENTRATOR COMPANY, INC.

911 Glasgow Avenue, Fort Wayne, Indiana

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Landing the right one is easy...

When fuel decisions are being made it's good angling sense to fish the right sources. Your one best bet is Bituminous! It's power-packed for multi-purpose—it's most convenient to your plant *and your supply won't dwindle. Ask our man!*

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B&O BALTIMORE & OHIO RAILROAD

BITUMINOUS COALS FOR EVERY PURPOSE

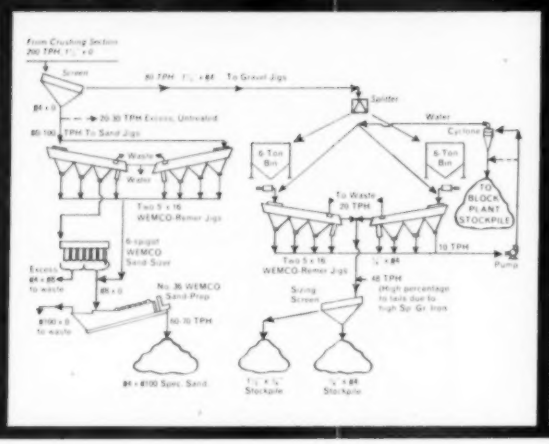
SHALE IN YOUR HIGHWAY PAVEMENTS?

"NOT WHEN YOU USE WEMCO®-REMER JIGS!"

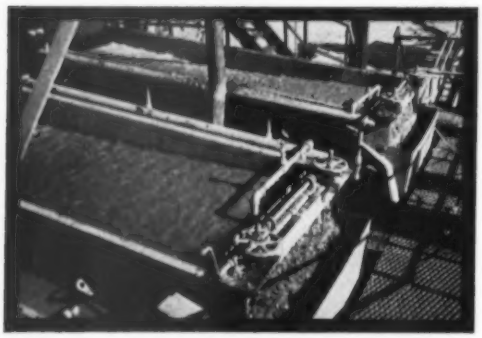
(The only Jig that will treat fine aggregates.)

John J. Simmons, Manager of Dakota Aggregates, Ironton, Minnesota reports:

Feed	To Sand Jigs	To Gravel Jigs
Shale	12%	5%
Iron Oxides	4%	3%
Product	**From Sand Jigs**	**From Gravel Jigs**
Shale Iron Oxides	1%	1%



"We could not meet highway specifications without the Wemco-Remer Jigs."



"These machines take a feed containing up to 12% shale and iron oxide and produce a product nearly free of unsound material. We have found that the long uninterrupted jig bed provides for a high percentage rejection of shales and light iron oxides which results in a very clean product. The rugged construction gives a low down-time operation while simplicity of design and ease of product control have enabled us to choose our operators from the nearby farm areas. We have become familiar with other types of jig units during our iron ore operation in Minnesota and Michigan, and we are satisfied that the Wemco-Remer Jigs have provided us with the results originally anticipated."

Need More information on Jig performance?
Talk to your nearest Wemco representative.

WEMCO®

a division of
Western Machinery Company
650 Fifth Street, San Francisco 7, California
Distributors throughout the world

THE WEMCO LINE OF QUALITY MACHINES FOR PROFITABLE AGGREGATE PROCESSING

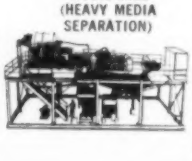
SAND-PREP WITH EXCLUSIVE LIFTING DEVICE

SAND-SORT

SAND-CLONE

ROCK & SAND JIGS

MOBIL-MILL (HEAVY MEDIA SEPARATION)



SAND-SIZER

SAND-SCRUBBER

PUMPS

pit and quarry

THE BASIC MAGAZINE IN A BASIC INDUSTRY

may 1960

23rd ANNUAL LIME and AGSTONE SECTION

Have you heard about the new

GRATE-KILN SYSTEM

for producing high-quality lime from stone?

Conventional Rotary Kilns are also built by Allis-Chalmers

Sales offices in principal cities in U.S.A. Distributors throughout the world.

ALLIS-CHALMERS

MILWAUKEE 1, WISCONSIN

- VIBRATING SCREENS
- GRINDING MILLS
- JAW CRUSHERS
- HAMMERMILLS
- GYRATORY CRUSHERS

A-1332

Enter 97 on card, page 233

Smidth

CEMENT COOLERS

The Smidth Cement Cooler, developed especially for cooling hot cement to temperatures acceptable for bulk shipment or immediate bagging, is externally water-cooled. The hot cement is introduced at the base and conveyed in a thin layer along the cooled interior surface to the top. High cooling efficiency is assured by the intimate contact of cement and the water-cooled surface.

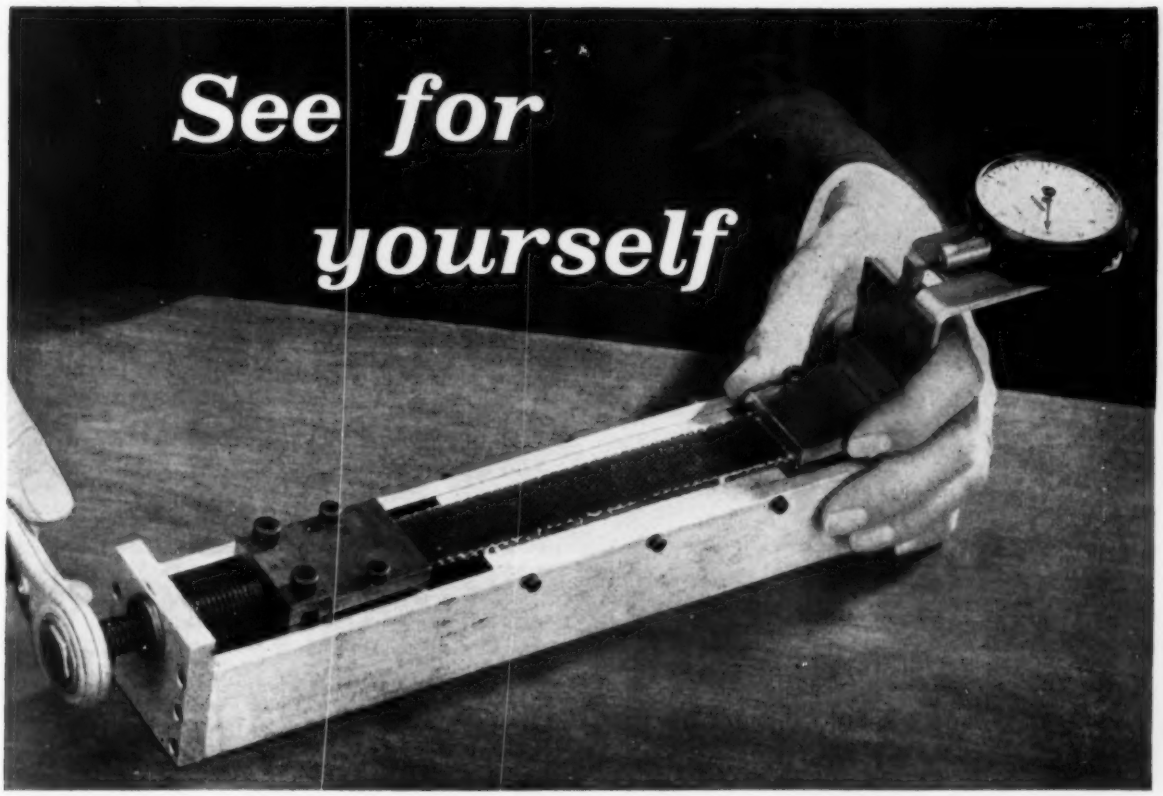
The Smidth Cooler may also be used with many other similar dry pulverized materials.

Illustrated: Two 6′ 6″ diameter by 17′ 7″ high Smidth Coolers ready for shipment.

F. L. SMIDTH & CO.

INCORPORATED

ROCKEFELLER CENTER
1270 Ave. of the Americas, New York 20, N.Y.

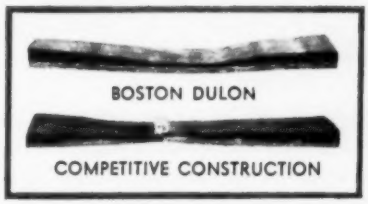


BOSTON Balanced Belt Construction prevents premature belt failure

BBC equalizes ply stress . . . eliminates overstrained plies, the most common cause of premature rupture and belt failure. BBC is the result of two unique BOSTON processes: Electro-Tensile Control (electronic control of ply tension) and Rotocure (continuous vulcanization for assured belt uniformity). 1296 belt tests prove it: BBC provides longer service life, lower operating costs.

DULON Covers prolong belt life

Another exclusive BOSTON research development, DULON greatly improves cover aging. Tough, specially treated DULON compounds stay resilient longer . . . dramatically withstand the roughest abrasion, gouging, tearing, oxidation. DULON has been proven more resistant than any other cover ever developed. DULON covers have proven their amazing performance on the toughest jobs.

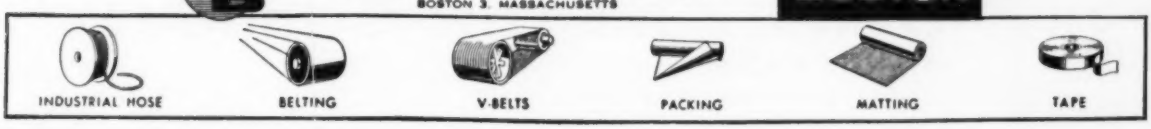


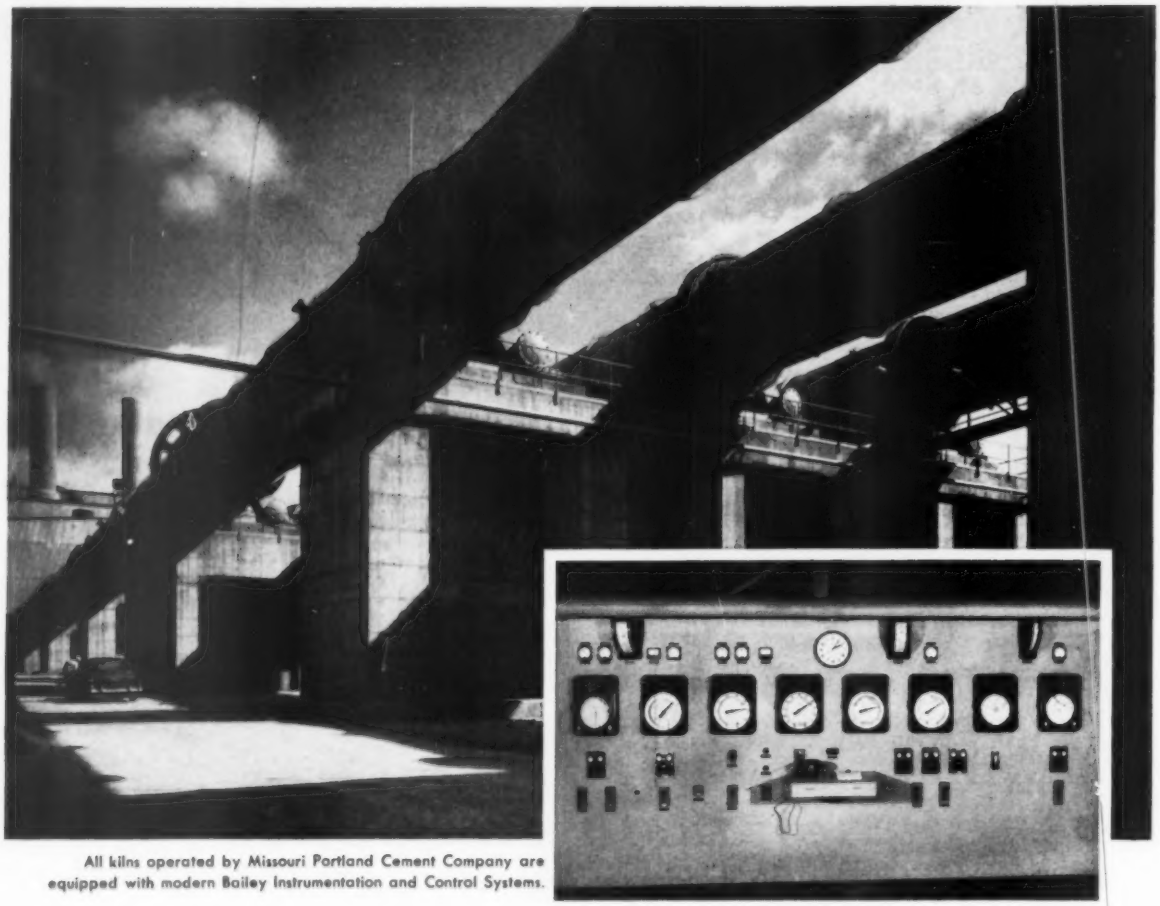
The BOSTON belt with the DULON Cover had a service life over 5 times greater than the competitive construction.

Your Boston representative will demonstrate at your desk Boston's exclusive Balanced Belt Construction. Simply call him now and see for yourself.

AMERICAN BILTRITE RUBBER COMPANY
BOSTON WOVEN HOSE & RUBBER DIVISION
BOSTON 3, MASSACHUSETTS

BOSTON





All kilns operated by Missouri Portland Cement Company are equipped with modern Bailey Instrumentation and Control Systems.

How to control the digestion of giant kilns

These giant kilns have delicate stomachs. But the Missouri Portland Cement Company knows how to coddle them to get maximum capacity, uniform product and low fuel rate.

They do it with a Bailey Control System with a central Control Panel where a single attendant has complete control of the variables of combustion and heating.

Because the system keeps continuous chart records, the Burner can check the reading and trend of Kiln Speed, Exit Gas Temperature, % Oxygen in Exit Gas, % Combustibles in Exit Gas, Kiln Shell Temperature, Hood Draft, Temperature of Secondary Air Leaving Cooler, Temperature of Coal-Air Mixture from Coal Mill, Fuel Gas Flow, Feed End Draft, Kiln Speed, Cooler Speed, Cooler Fan Discharge Pressure, Cooler Undergrate Pressure, Cooler Air Flow, Coal Mill Primary Air Pressure, Coal Mill Exhauster Fan Suction, and Fuel Gas Flow.

The system works so dependably that week-long kiln runs have been made without the operator touching anything.

Let a Bailey Engineer help you plan for peak performance! For additional information write for a Bailey Kiln Control Folder. C-14

BAILEY METERS

BAILEY METER COMPANY

1051 IVANHOE ROAD • CLEVELAND 10, OHIO

In Canada—Bailey Meter Company Limited, Montreal

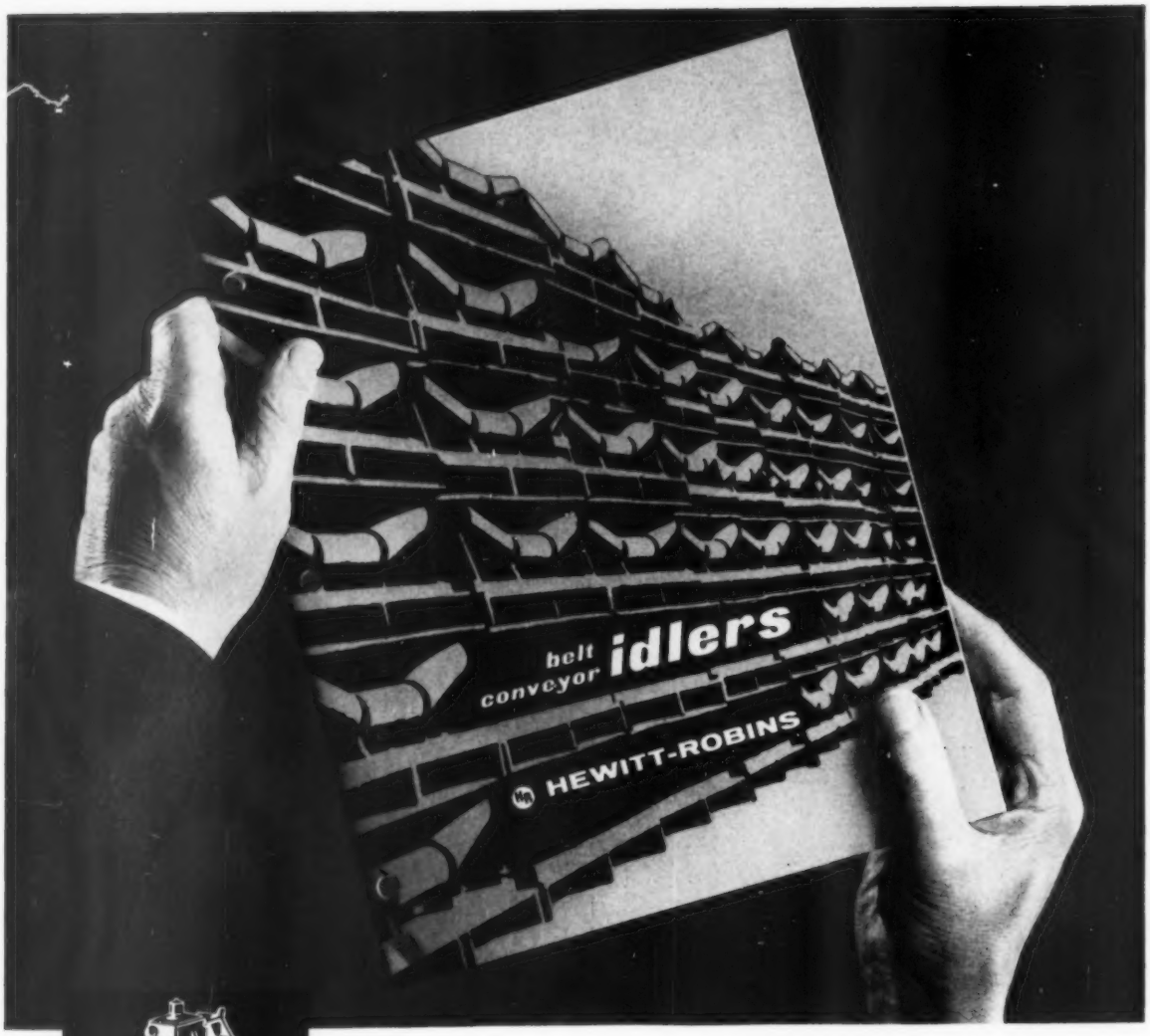
FOR A SUPERIOR AGRICULTURAL LIMESTONE PRODUCT ... IN ONE LOW COST OPERATION

Whether the mesh is 10 or 20, Bradley Hercules Mills reduce limestone to a uniform fineness in a single operation without additional screening . . . . . produce finished material containing a large percentage of 60, 100 and 200 mesh. And Bradley Hercules Mills also eliminate manual operation through an electrical feed control. Their rugged construction . . . dustless operation . . . easy accessibility to grinding parts keep maintenance costs at an absolute minimum . . . provide maximum service, 7 days a week. In sizes to meet any plant's requirements for a superior grade of agricultural limestone . . . at moderate cost.

See Chemical Engineering Catalog or for complete information, write for Catalog No. 63

BRADLEY PULVERIZER CO.
superior grinding equipment since 1891

LONDON ALLENTOWN, PA. BOSTON



SPEED REDUCERS

CONVEYOR BELTING

VIBRATING EQUIPMENT

Idler questions? H-R has the answers!

At last! A truly comprehensive book on belt conveyor idlers that answers *all* your questions. The new Hewitt-Robins "Belt Conveyor Idlers" book is one of the most complete ever offered to industry. In it you'll find:

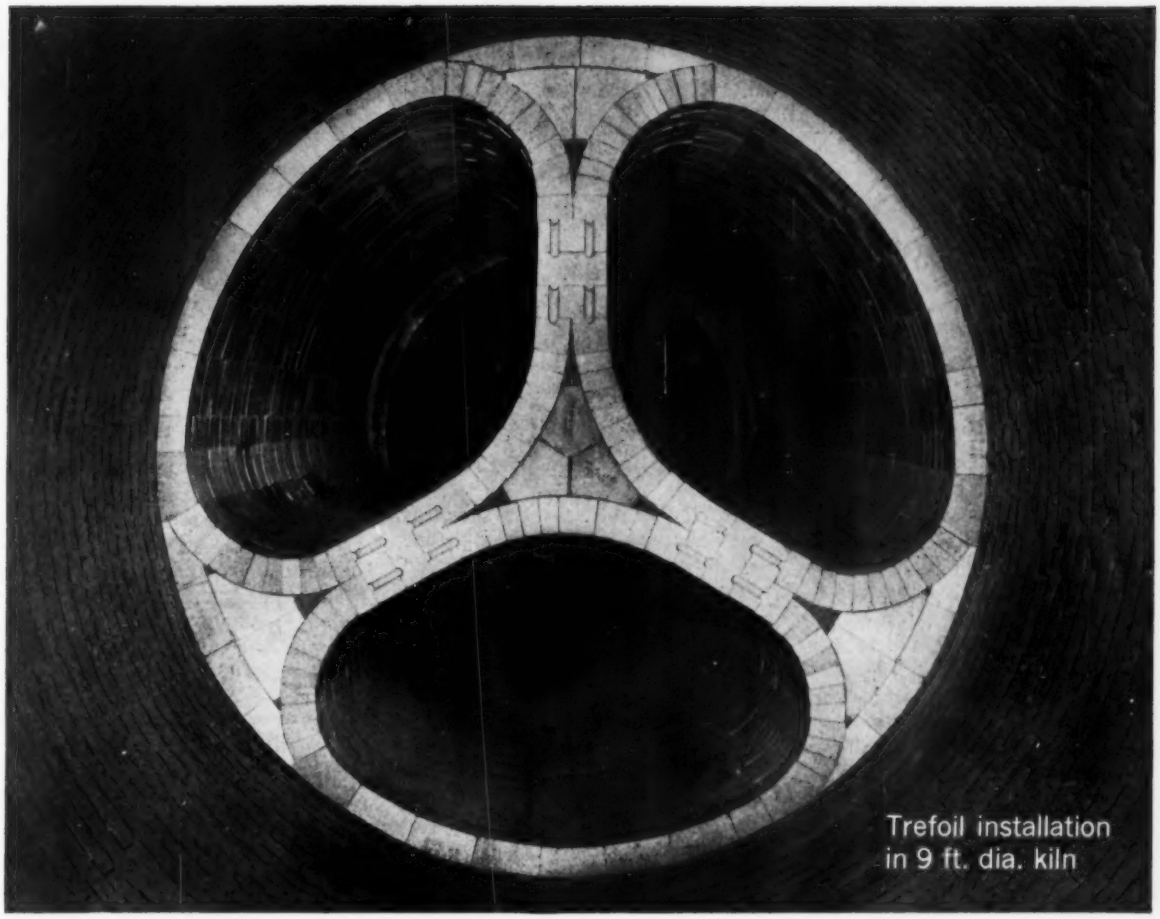
- More than 80 helpful graphs, sketches, tables, charts; 150 illustrations; 48 pages of detailed information you can use.
- Comparison of ten competitive idler designs.
- Answers to questions frequently asked about idlers.
- Engineering information on belt speeds, conveyor capacities, idler spacing, and other factors you must consider in selecting idlers.
- Complete explanation of 14 basic types of idlers manufactured by H-R to fit every belt conveyor need.
- Tips on how to extend the life of idlers.

For your copy, consult your H-R representative, or write Hewitt-Robins, Stamford, Connecticut. Ask for Bulletin 5-24.

HEWITT-ROBINS

The name that means everything in bulk materials handling systems...

CONVEYOR BELTING AND IDLERS • INDUSTRIAL HOSE • VIBRATING FEEDERS, SCREENS & SHAKEOUTS • POWER TRANSMISSION EQUIPMENT



Refractory Heat Exchangers increase rotary kiln efficiency

Harbison-Walker TREFOIL design provides important benefits

This construction built with refractories especially suited for the purpose is showing exceedingly gratifying economies in rotary limestone and lime sludge kilns. Its use is the means of imparting sensible heat to the charge, even to the degree of partial calcination in some installations.

The structural strength of the trefoil construction is proving its excellent durability. An original installation in a 10′ diameter kiln has now been in service for three years, with indications of considerably longer life. This good service presently is approaching repetition in a number of other kilns.

The magnitude of preheating of the charge in passing through the trefoil tends to moderate the temperature in the hottest zone, necessary for a given rate of production. The development of excessive accretions in the high temperature zones with certain fuels may be reduced and the lining life extended.

Net results from the use of the trefoil are fuel savings and increased production in kilns which are not greatly overloaded beyond rated capacities.

H-W technical service is freely offered in helping determine various details such as length of the trefoil section (usually 15 to 25 ft.) and longitudinal location for the various conditions involved.

Harbison-Walker Refractories Company
AND SUBSIDIARIES
GENERAL OFFICES: PITTSBURGH 22, PENNA.
World's Most Complete Refractories Service
HW 60-3

Small Stone Leads to Big

New rotary kiln joins six shafts in lime plant expansion

By BUREN C. HEROD

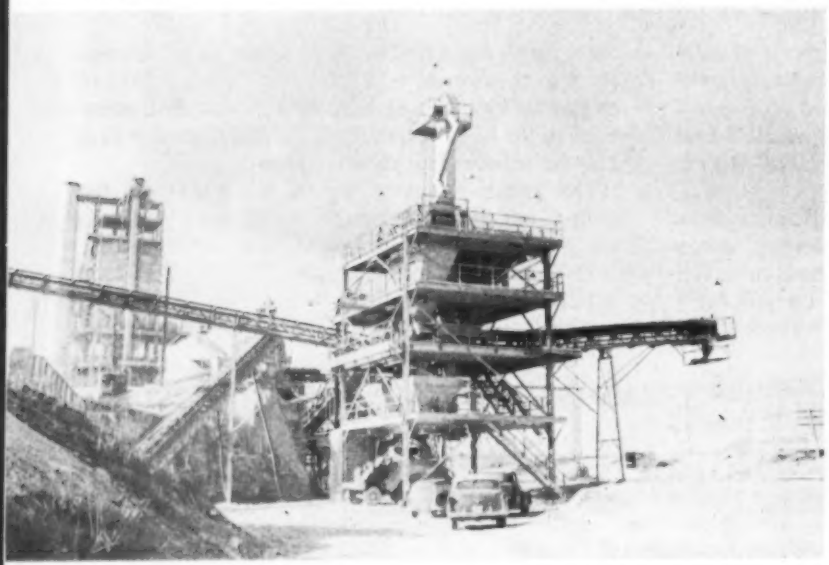
ANOTHER ON THE SPOT report

MARKET conditions, plus customer requirements, plus small stone inventory equals a new rotary lime kiln installation at the Austin White Lime operations, near McNeil, Tex.

When the new 225-t.p.d. calciner was placed on the line last September to join six existing shaft kilns, the productive capacity of Austin White Lime was almost doubled—a strong boost in a competitive market. By producing rotary kiln lime, with less than 1 percent core, Austin White Lime met certain customer requirements for a highly reactive lime with low residue. And far from the least important factor is the ability now to utilize small stone—of which substantial stockpiles had been created in past operations as a natural consequence of processing feed for the shaft kilns.

Designed by Kennedy-Van Saun and comprised of K-VS equipment, the new kiln installation was erected by American Bridge under the general supervision of Al and George Robinson. Construction, started in March last year, had been preceded by several months of study of factors involved in such a major project. On September 15, six months later, the new unit was placed in production.

THIS SECONDARY CRUSHING-AND-SCREENING PLANT was another important part of the expansion program. Rotary kiln feed, and smaller fractions such as agstone, are processed here.



Although it is the largest single phase, the rotary kiln and its related equipment are actually the latest part of an extensive improvement and expansion program in which management has been involved. Within the last five years a sixth shaft kiln was installed, plus two 6-drum hydrators and two mills. The last shaft kiln, when installed in 1957, raised capacity to 300 t.p.d. When the existing single mill and 4-drum hydrator were joined by larger units, the hydrate capacity was raised to 360 t.p.d. Developments in road stabilization were a primary factor in the background of the hydrate department expansion.

Another new phase, and one that is related more directly to the recent rotary kiln project, is a new secondary crushing and screening plant. This operation now processes stone for both the rotary and the shaft kilns and also undersize fractions into an agstone product. A large new shop building was also built last year to provide centralized maintenance of all heavy mobile equipment.

In addition to the road stabilization noted above, the company's basic markets in chemical lime applications include paper mills, steel mills, oil refining, water treatment, and insecticides. Some tonnage is also sold to the building trade. The operation is strategically located for both truck and rail shipment; and the latter, representing about 60 percent of consignments, originates on the Missouri Pacific and Southern Pacific railroads.

Even with the nearly 100 percent increase in capacity, the Austin calcining operations can be more than

Project

adequately supplied with raw material for years to come. At the present rate of production, it is estimated that there is enough good stone in the approximately 8,000 acres available for another four or five centuries!

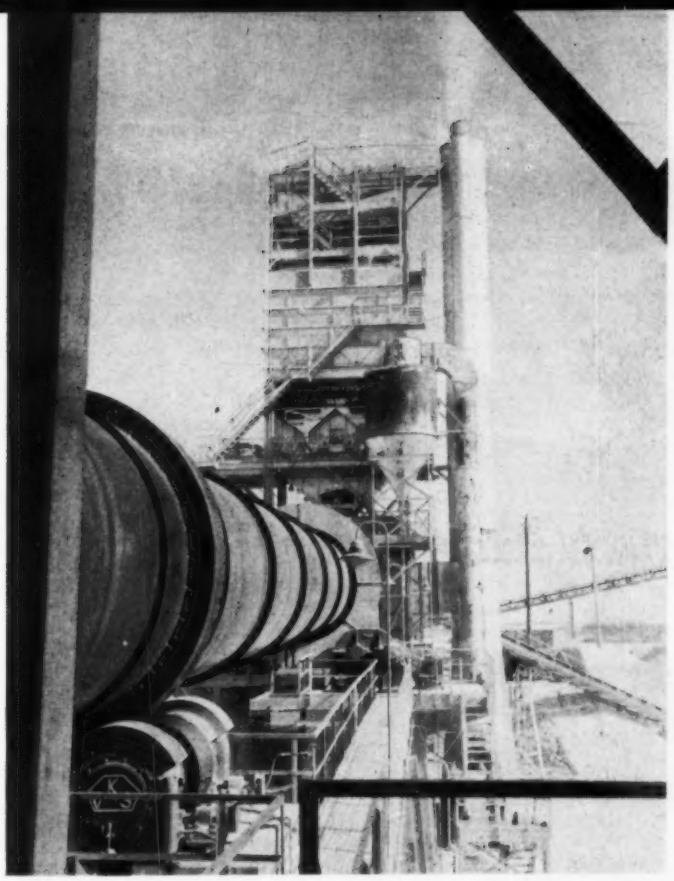
The quarry is located in the exposure of the Edwards limestone formation in the well-known Balcones escarpment. Currently, the working face averages 15 ft. in height. However, it is planned later to make a full cut in the top 26 ft. of the formation.

Blast holes are sunk by a Damco Blastholer equipped with a 2½-in. bit. From 50 to 100 holes are drilled for a shot on a 6- by 10-ft. pattern in four rows. Drilling rates have reached 200 f.p.h., and up to 400 ft. of hole have been drilled between bit sharpenings.

The holes are charged with dynamite in the bottom, and an ammonium nitrate prill-fuel oil mixture above. This charge of 60 percent nitrate, and 40 percent dynamite has resulted in yields of 2½ to 3 cu. yd. of stone per lb. of explosive. A 1½-cu. yd. Bucyrus-Erie 38B shovel is used to load a fleet of five (three 15- and two 18-ton) Euclid trucks for haul to the plant feed hopper.

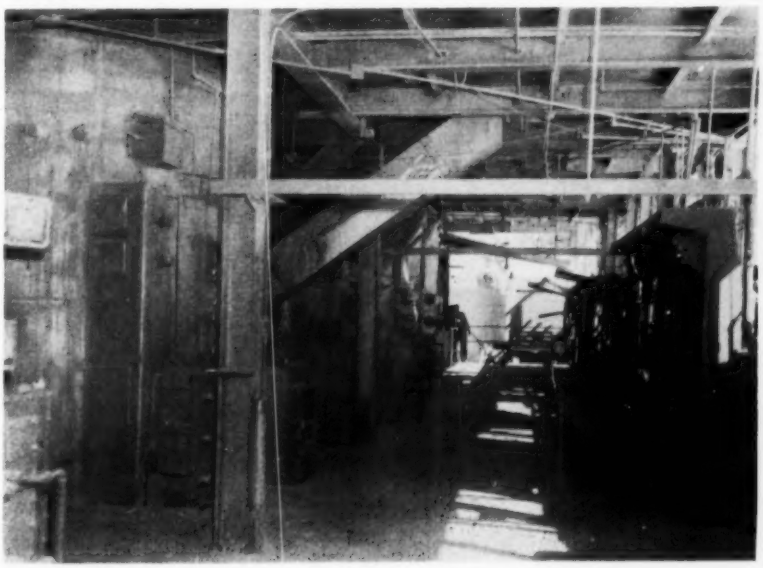
The original feed hopper and primary crushing installation was left unchanged in the recent expansion program. It is comprised of a Diamond feeder, and a 2436 Diamond jaw as the primary breaker. Quarry-run stone is reduced through a 5¾-in. setting, and discharged to a belt conveyor for transport to the primary screen.

At the latter point the feed is separated for flow of the larger ma-

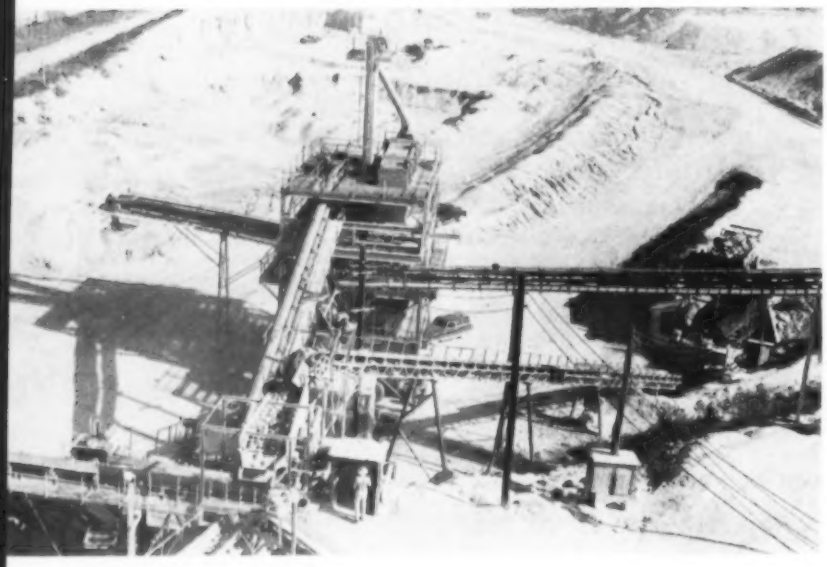


AUSTIN'S NEW 225-T.P.D. ROTARY KILN was placed on the line last September as the largest single phase in a comprehensive expansion program. A new shaft kiln was installed two years earlier, bringing the total number of vertical calciners to six.

A VIEW ON THE FIRING FLOOR for the six shaft kilns. The latest one of these gas-fired units was added about two years ago. Also seen here is part of the extensive structural remodeling of the plant, involving replacement of timbers with steel members, metal siding, etc.



THE QUARRY, currently worked on a 15-ft. face, is in an exposure of the Edwards limestone in the Balcones escarpment.



terial to the shaft kiln system, and that of the smaller material for subsequent processing of rotary kiln stone and other products.

The primary screen, a 5- by 10-ft. Pioneer triple-deck unit, has 6-in. round openings in the top deck, 2- by 4-in. in the middle, and 1¾-in. in the bottom. Stone retained on the upper two decks is chuted to an inclined conveyor for transfer to a pair of shaft kiln feed bins. Material passing the bottom deck may, if wet, be conveyed to a bin, or it may be conveyed directly to the new secondary crushing and screening installation. The bottom deck retained fraction may also be placed in a bin, or chuted to a conveyor for transfer to the secondary plant. For further flexibility, these two materials may be carried separately or together to the latter phase.

Flow entering the secondary screening and crushing operation is delivered to a 4- by 12-ft. double-deck Diamond screen. Separation is made with 1¾- by 3-in. slotted opening screencloth on the upper deck, and ⅜-in. opening cloth on the lower. The top-deck fraction is chuted to the secondary crusher, a Kennedy-Van Saun 38½ gearless gyratory, and the product of this reduction is transferred to the secondary plant feed belt on a return conveyor in closing the circuit.

The ⅜-in. fraction retained on the lower deck is chuted to a belt conveyor for transport to the surge pile of rotary kiln stone. Material passing this deck is placed in a bin or delivered to a Link-Belt bucket elevator and raised to discharge on a Hewitt-Robins Hi-G screen at the top of the plant.

This screen, a double-deck unit, makes separations with ¼- and ⅛-in. opening screencloth on the upper and lower decks, respectively. Both retained fractions are chuted to an Allis-Chalmers Pulverator, and the products of this fine reduction are returned *via* the bucket elevator to

Middle:
QUARRY-RUN STONE delivered to the hopper, right, is separated between shaft kiln feed and secondary crushing plant feed on the screen, lower left center.

Left:
THIS SURGE PILE of rotary kiln feed stone is supplied from the secondary plant via the conveyor, left. The reclaiming tunnel houses four draw points.

the above screen in closed circuit.

Minus ⅛-in. material may be loaded from an underlying bin directly onto trucks or rail cars, or it may be conveyed to a stockpile of agstone.

As seen in accompanying photographs, the rotary kiln stone is recovered from the surge pile *via* reclaiming tunnel conveyors, and the shaft kiln stone is drawn from the two tanks into 2-cu. yd. charging cars traveling on an inclined tramway.

The surge reclaiming tunnel, 8 by 10 ft. in cross section, houses four draw points, two of which are fitted with Jeffrey vibrating feeders. Draw from the other two is done *via* gates and chutes. The reclaiming conveyor and all others in the new secondary crushing and screening plant installation are comprised of Barber-Greene components and are fitted with Goodrich belting.

At the preheater section of the new rotary kiln installation, the feed stone is discharged from the reclaim conveyor into the boot of a Link-Belt bucket elevator and raised to the top of the 94-ft. high preheater structure. At this point it is delivered to a 4- by 6-ft. K-VS AAA single-deck screen for separation of plus and minus ½-in. material. Throughs are either sent to stockpile or are returned to the agstone crushing circuit in the secondary plant.

Kiln feed stone retained on the screen is chuted into the underlying 200-ton capacity stone bin of the preheater. From this bin, the stone flows *via* gravity through grates into the preheater chamber, which is 7-ft. high. Retention time in the preheater is approximately 2 hours, and the stone is delivered by plunger feeders into a dust chamber, and then into the kiln feed pipe.

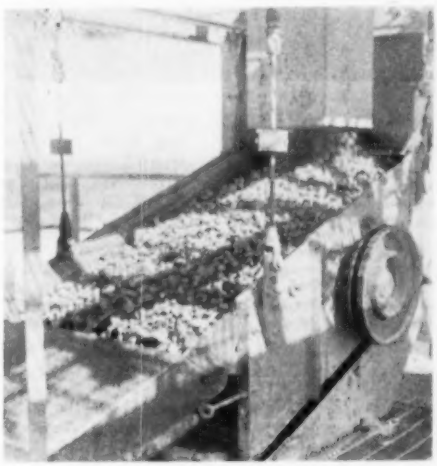
Feed stone exits from the preheater with temperatures between 1,500 and 1,550 deg. F., and already has 10 percent or more skin calcination. In addition, for the first 10 ft. of travel in the kiln, it passes through a sexpartite alloy stainless steel recuperator.

A 10- by 150-ft. unit, the kiln has a 40-hp. main drive through a Falk variable-speed reducer, and rotates at about 53 r.p.h. Emergency drive is available from a Continental Red Seal engine. The kiln is lined throughout with A. P. Green refractories, and is fired with natural gas. Calcining temperatures range from 2,300 to 2,350 deg. F. An emergency cut-off control in the fuel line protects the kiln in the event of power failure by shutting off the flow of gas to the burner. An automatic draft cut-off is also provided.

Fuel efficiency when the kiln is operated under rated capacity, or at an average of 200 t.p.d. of lime, has been 6 million B.t.u. This is materially reduced when production is 225 t.p.d. or better. A primary factor in this performance is the preheating of the kiln feed.

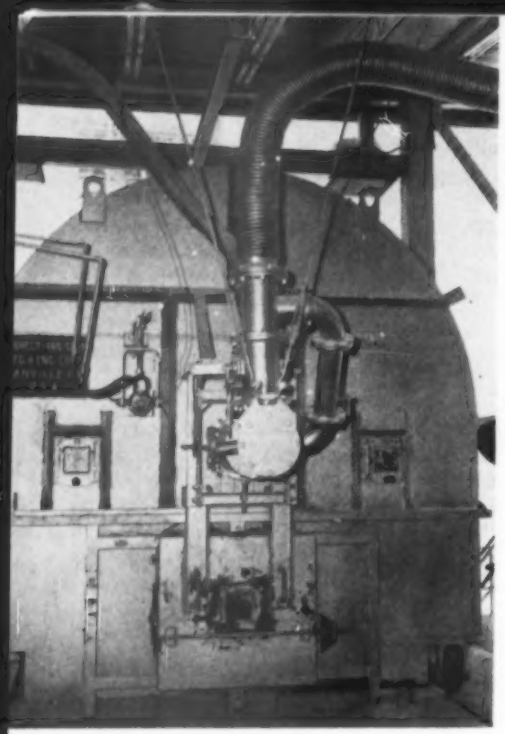
Kiln gases leave the feed hood at 1,700 deg. F., drop about 100 degrees in the dust chamber, and start through the preheater section at 1,600 deg. By the time the kiln exhaust has reached the I.D. fan, a K-VS size 91, and enters the 100-ft. stack, the temperature is only 500 deg.

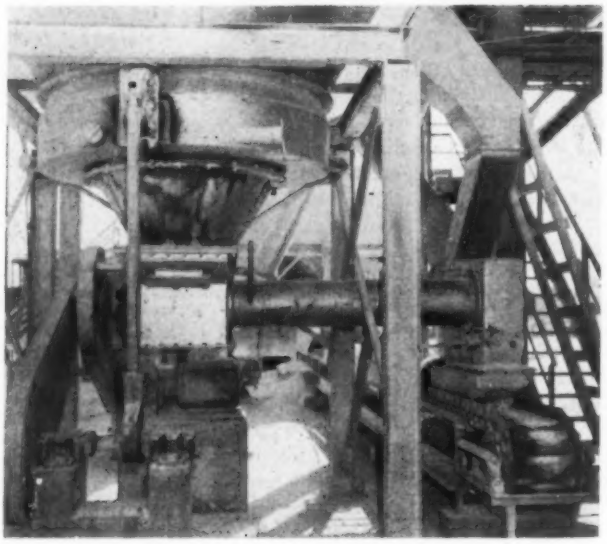
Primary combustion air is furnished by a size 82.9 fan, secondary air being drawn through the K-VS contact cooler immediately below the firing hood. Instrumentation and operating controls include a Republic gas flow meter, Leeds &



ROTARY KILN FEED is passed over this screen at the top of the preheater for removal of minus ½-in. material before the stone is delivered into the 200-ton preheater bin.

SHAFT KILN STONE is drawn from storage bins and transported up the tramway, right, in charging the vertical calciners.





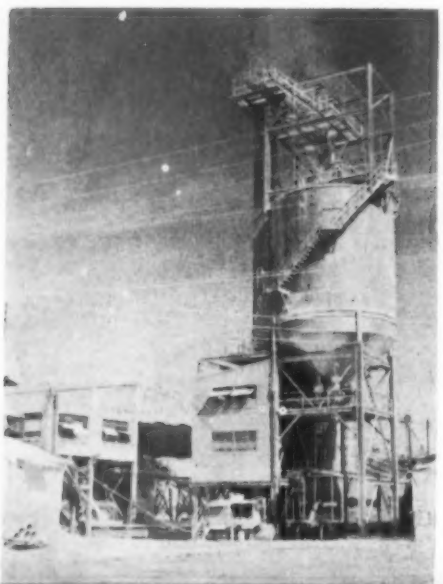
Above, left:
A CLOSEUP OF THE FIRING HOOD on the 10- by 150-ft., gas-fired rotary kiln. Flow of gas to the burner pipe is stopped by an emergency cut-off control in the event of power failure.

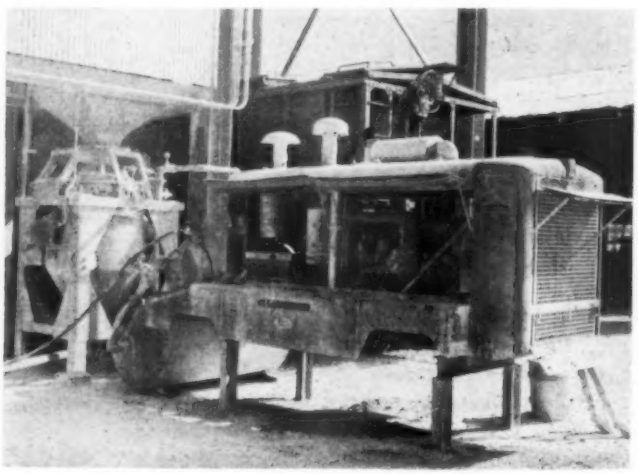
Above, right:
THE INSTRUMENT AND CONTROL PANEL for the new rotary kiln. Checking operations are O. G. Leppin, plant engineer, left, and Barney Koepp, production superintendent.

Right:
THIS CONTACT COOLER reduces the temperature of lime discharged from the rotary kiln to about 150 degrees F. Cooled lime is removed by the horizontal screw, center, and delivered to the apron conveyor, right.

Below, left:
COOLED LIME is elevated to a screen at the top of this 4-compartment bulk quicklime silo. Larger fractions may be delivered to a double roll crusher and then returned to the screen in closed circuit. Either rail or truck bulk loading can be accommodated from this silo.

Below:
THIS PNEUMATIC PUMP INSTALLATION is used to transfer material from the bulk quicklime silo through a 3-in. line to bins in the hydrate and bagging departments.





Northrup Speedomax units and a Rayotube pyrometer, and Hays draft recorders.

In the contact cooler, which has an oscillating agitator, the temperature of the lime is dropped to about 150 deg. Normally, the cooler discharges the lime into a 9-in. screw conveyor leading to an apron conveyor. However, a bypass is provided to maintain the flow of material in the event of a breakdown or a jam in the primary system.

The Link-Belt apron conveyor transfers the lime to either of a pair of bucket elevators, also Link-Belt units. These 102-ft. elevators (one is a stand-by) raise the lime to the top of a 4-compartment silo, where it is discharged onto a 3- by 8-ft. triple-deck K-VS type A screen.

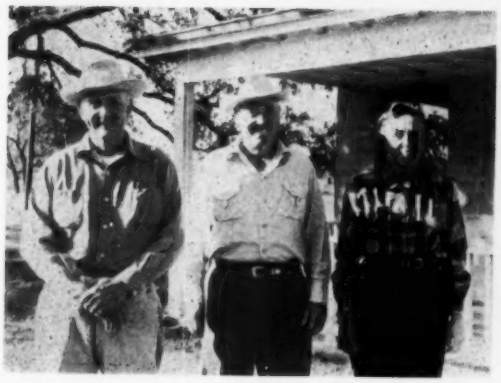
Separation is made on ½-, ⅜-, and ⅛-in. opening cloth (top to bottom decks), with the fractions flowing separately or in desired blends to the appropriate compartments. The larger-size material may be drawn from its compartment for reduction in a 30X22 K-VS double-roll crusher. The products of this crushing are then returned to the above screen in closed circuit *via* the bucket elevator.

Bulk quicklime may be loaded from the various compartments of this silo directly into either truck or rail carriers. For supplying the hydrate plant and operations, material is transferred from the lime silo compartments through a 3-in. line by a K-VS pneumatic pump. Air for this system is provided by an Ingersoll-Rand Gyro-Flo compressor.

With the additions made in recent years to the hydrate operation, this phase now includes two 6-drum Kritzer hydrators and one 4-drum, to which lime is fed by Hardinge constant-weight feeders. Hydrate is ground in two No. 1 and one No. 0 Raymond automatic pulverizers. The capacity of the hydrate department is now about 360 t.p.d.

Also installed is a Raymond high side roller mill with whizzer separator, cyclone collector, and flash drying equipment for production of pulverized quicklime and limestone. Capacity of this equipment, depending on product fineness, ranges from 5 to 10 t.p.h.

Bagging of both hydrate and quicklime is handled by a pair of 2-spout St. Regis 205-FL packers and a 4-spout Fluopacker. About 40 percent of the tonnage shipped from McNeil is bagged.



MANAGEMENT. Al, George, and Flora Robinson head the management team. The Robinson family has been connected with this operation for nearly 75 years.

When the sixth shaft kiln was added in 1957, as noted earlier, the capacity of that department was raised to 300 t.p.d. Some years previously these shafts had been revamped; and individual capacities were raised from 20 to 40, and ultimately to the current level of 50 t.p.d. Equipped with Azbe-type center burners, they are also fired with natural gas, and fuel consumption averages a little over 6 million B.t.u.'s.

At present lime is drawn at intervals of 65 minutes, and is received on a pan conveyor for transfer to storage bins. With improved performance of the shaft kilns, the pan conveyor no longer is needed in its original basic use as a cooler, but simply as a material-handling unit. The kilns are lined with Harbison-Walker refractories which have given service life up to 28 months.

Along with modernization of production phases, an extensive program of plant repair is nearing completion. Considerable work has been devoted to fire-proofing—a project that involved replacing older timber structural members with steel. Concrete masonry and metal siding were used throughout the new kiln installation and shop building, and are being applied extensively in the renovation of the older plant structure.

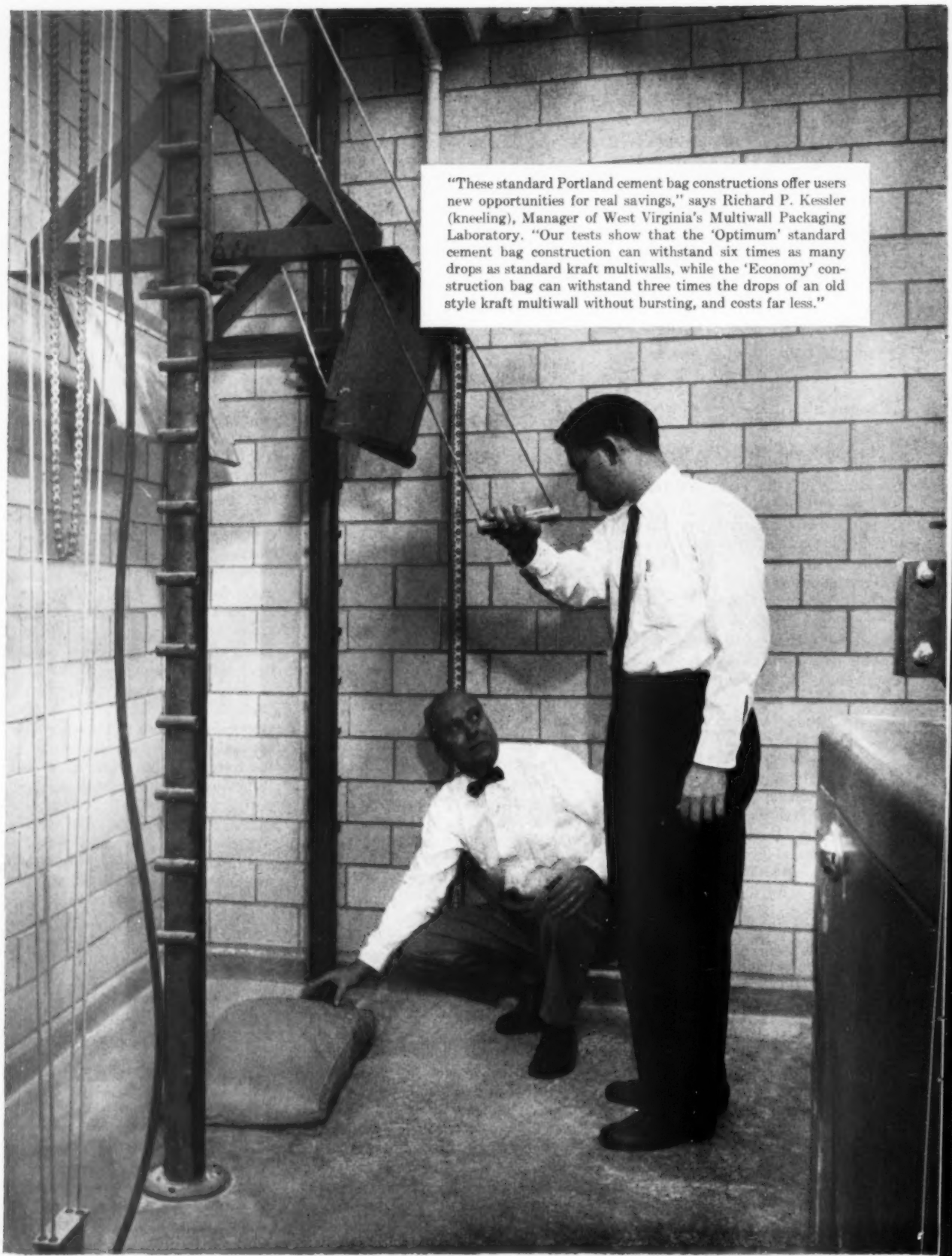
Fittingly, the impressive expansion of Austin White Lime operations has a long and interesting historical background. The company was founded in the 1870's, and the first Robinson family connection dates from 1888. Stone kilns were in use as calciners until 1930, fired with wood and lignite. However, the end was in sight for the old stone kilns by 1925, when the first steel shaft kiln was erected.

This unit, and subsequently installed shafts, were initially equipped with gas producers. Fuel was later changed to oil, then to lignite (fired in furnaces), and finally to the present natural gas. Revisions to operating design, as noted previously, raised shaft kiln capacities almost three-fold.

Heading this long established organization are three partners—Al, George, and Flora Robinson, brothers and sister. The synonymity of the names Austin White Lime and Robinson will probably be long enduring, since between them the brothers have five sons who are (or will be) coming up in the firm.

Among the key supervisory and production personnel at McNeil are O. G. Leppin, plant engineer; Barney Koepp, production superintendent; John Tyler, assistant plant manager; and J. J. "Kayo" Cloud, quarry foreman.

Arrangements have been made by the Union Lime Company Limited (South Africa) with several European financial houses for loans totaling £100,000 ($280,500) for a period of two years. Purpose of the loans: installation of a new plant for production of additional products, establishment of a new quarry, and modernization of the existing plant.



"These standard Portland cement bag constructions offer users new opportunities for real savings," says Richard P. Kessler (kneeling), Manager of West Virginia's Multiwall Packaging Laboratory. "Our tests show that the 'Optimum' standard cement bag construction can withstand six times as many drops as standard kraft multiwalls, while the 'Economy' construction bag can withstand three times the drops of an old style kraft multiwall without bursting, and costs far less."

NEW!

WEST VIRGINIA'S 1960 STANDARD BAG CONSTRUCTIONS TO SAVE YOU MONEY

Substantial savings for cement companies are achieved by two new standard WONDERWALL bag constructions perfected by West Virginia for packing Portland cement.

During a controlled test to determine possible savings in bag costs, various WONDERWALL constructions were developed in our Multiwall Packaging Laboratory. They were tested by 24 plants which shipped 1,118,415 barrels of cement in 5,282,966 WONDERWALL bags.

Result of this laboratory and field proving was the development of the superior "Optimum" and "Economy" bags for packing Portland cement. The new constructions are shown in the box.

The new 3-ply Economy WONDERWALL *is tougher than the 4-ply natural kraft multiwalls in all respects, and offers a cash saving of $2.75 per M in bag cost.*

The 3-ply Optimum WONDERWALL gives far better performance than the heavier 4-ply kraft multiwall, both in the mill and in transit. Whereas natural kraft breakage ran as high as 5% in truck shipments, the WONDERWALL Optimum bag reduced it to less than 1%. Breakage in rail shipments dropped from 6 to 10 bags per car to 1 or 2 maximum. The reduction in bag breakage alone provides a realistic cash saving, to say nothing of improved customer and employee satisfaction.

Secret of WONDERWALL strength is Kraftsman Clupak* extensible paper. Its built-in stretch withstands far more impact without breaking than conventional natural kraft. In a WONDERWALL bag, fewer plies are needed to do the job!

See how WONDERWALL standard bag constructions can cut your costs, increase your profits. Our technical service experts are ready to help you take full advantage of these new bag developments; call or write Multiwall Bag Division, West Virginia Pulp and Paper Company, 230 Park Avenue, New York 17, N.Y.

**Clupak, Inc.'s trademark for extensible paper manufactured under its authority and satisfying its specifications.*

NEW STANDARD WONDERWALL CEMENT BAG CONSTRUCTIONS

Pounds Packed	Old Style Natural Kraft Construction	Optimum Wonderwall	User Benefit
94#	3/40, 1/50	3/50	less breakage

	Economy Wonderwall	
94#	3/40, 1/50	1/50, 1/40, 1/50	$2.75/M and less breakage

WONDERWALL bags of the "Optimum" construction have reduced breakage at the North American Cement Corporation's Security, Maryland, plant.

West Virginia Pulp and Paper

Agstone Made from Lime Plant Waste Stone Fines

flexible Canadian operation produces variety of salable products

By WALTER E. TRAUFFER

ANOTHER ON THE SPOT report

GYPSUM, Lime & Alabastine Limited, a Division of Dominion Tar & Chemical Co., Ltd., early in 1959 completed a limestone drying and grinding plant at Beachville, Ontario. This plant is notable for its flexibility in producing argicultural limestone and other fine products to specifications. These materials can be bagged or loaded in bulk into cars or trucks for shipment. The decision to build this plant was partly motivated by the growing surplus of stone screenings from the quarry operations.

This limestone processing plant was designed to dry the screenings too small for the rotary kilns* and to grind and size it for various uses. These screenings are ¼ in. minus in dry weather and ½ in. minus in wet winter weather, when fine screening is impractical. The products are agricultural limestone and various other products, including mineral and asphalt fillers, cattle feed, sintering stone for steel companies, etc. The plant has a rated capacity of 30 t.p.h., but this varies depending on the size of the feed and its moisture content, and on the products being made. The entire operation was designed so that its capacity can be doubled by adding another drier, separator, etc., all other facilities being adequate.

*See PIT AND QUARRY, May, 1958, pp. 112-15, 18, 19.

The new limestone drying, grinding, and pulverizing plant of Gypsum Lime & Alabastine, with the rotary drier at the right and the mechanical separator above.

The four basic products being made are:

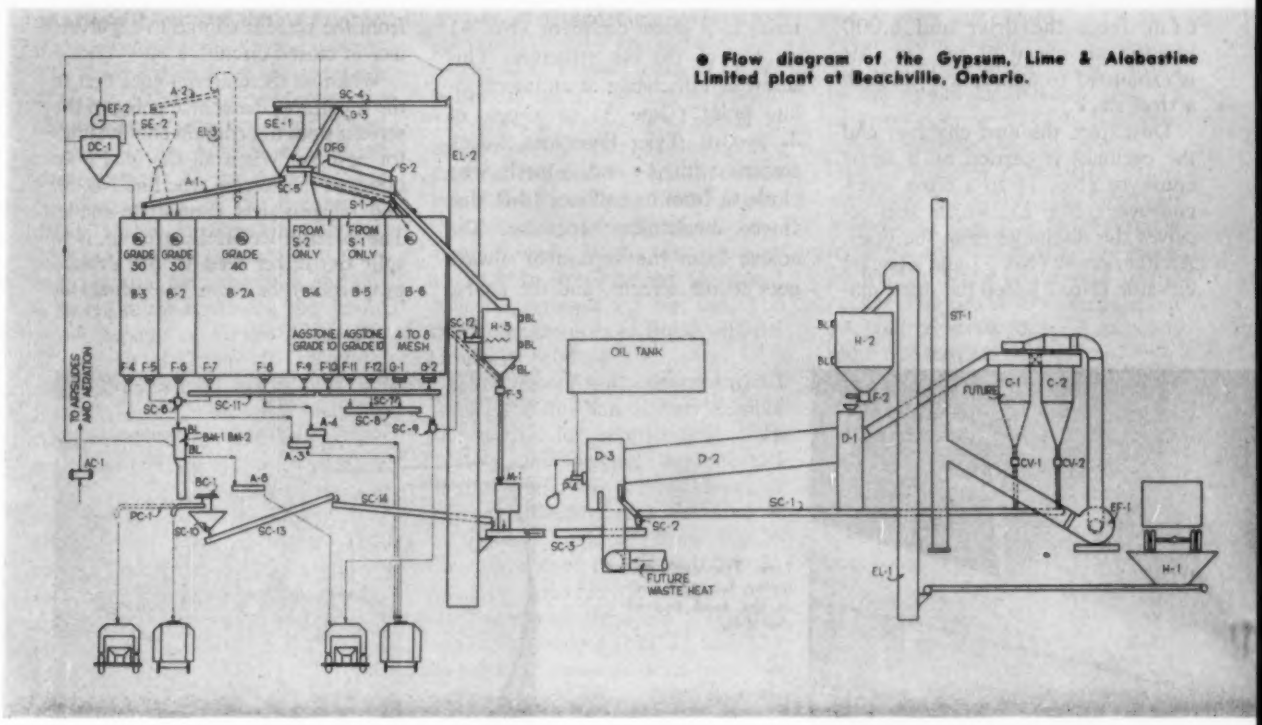
Grade 10 or agstone, which is 100 percent through 10-mesh and 35 to 40 percent through 100-mesh.

Grade 30—various mineral fillers —100 percent through 30-mesh and 80 percent through 200-mesh.

Grade 40—mineral fillers—100 percent through 40-mesh and 90 percent through 200-mesh.

Sinter stone—98 percent through ¼-in. and 16 percent through 100-mesh.

This is a new field for the company in Ontario, and the markets are being developed and expanded. The demand for agstone is important and it is steadily growing. The company works with the Ontario Department of Agriculture, which sets the specifications for agstone and subsidizes its transportation to the farmer in order to encourage its use. The Department's county representatives make free soil samples to check the need for agstone, and they advise the farmers of their findings. The freight subsidy is 4 cents per mile up to the



● **Flow diagram of the Gypsum, Lime & Alabastine Limited plant at Beachville, Ontario.**

Keyed Equipment List for Gypsum Lime & Alabastine Flow Diagram

A-1	Airslide (separator to bins)	DC	Dust collector
A-2	Airslide (elevator to separator)	DFG	Double flop gate assembly
A-3 to A-6	Airslides (bulk loading)	EF-1	Exhaust fan (dryer)
		EF-2	Exhaust fan (dust collector)
AC	Air compressor	EL-1 to EL-3	Elevators
AP	Aeration pads	F-1 to F-12	Feeders
B-2 to B-6	Material bins	G	Slide gates
BC-1	Belt conveyor (bag loading)	H	Hoppers
BL	Bin level indicators	M	Mill (pulverizer)
BM	Bagging machines	PC	Portable conveyor (bag loading)
C	Cyclones	S	Screens (4' x 8')
CV	Counterweighted valve	SE-1	Separator (14-ft.)
D-1	Dust chamber	SE-2	Separator (10-ft.)
D-2	Dryer	SC-1 to SC-12	Screw conveyors
D-3	Dryer furnace		
D-4	Oil burner, fan, tank		

maximum of $2 per ton, but in special cases more is allowed.

The plant actually has three separate flows:

1. Raw material coming into the plant through the drier to a separator and screen and into bins.
2. Feed of the coarser products from the bins to a mill and back into the circuit or from the bins direct to bulk cars or trucks.
3. Feed of the finer products from the bins to a bagger or in bulk to cars or trucks.

The raw stone for this plant is hauled in by trucks either from the storage silos or the stockpiles at the quarry stone-processing plant. A vibrating feeder discharges from the truck hopper on a short belt conveyor, and a bucket elevator (No. 1) discharges it into the 12-ton drier feed hopper. A rotary disc feeder discharges this stone through the scroll casing or dust chamber at the feed end of the drier.

The 6- by 50-ft. Allis-Chalmers rotary drier is unlined and has a steel plate cone to draw in the material. There are plate lifters 10 in. high by 4 ft. long in staggered alternate sets for the length of the drier, and two 10-in. plate dams, respectively 8 and 20 ft. from the discharge end.

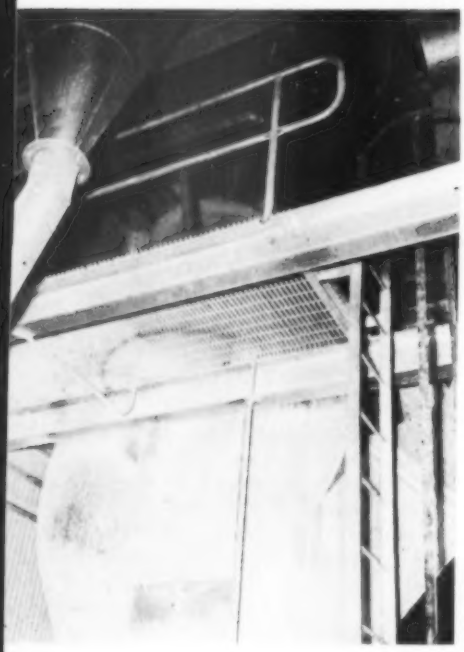
The drier is fired with Bunker C oil by a Hauck No. 782 burner. This oil is stored in a 5,000-gal. tank. The capacity of the drier is about 30 t.p.h., and the drying temperature is varied between 250 and 400 deg. F. depending on the moisture content of the stone.

Exit air and dust from the drier is drawn through the dust chamber to a 6-ft.-dia. Western Precipitation cyclone collector. The air from the cyclones is drawn to a 12,000-c.f.m. Sheldon exhauster which is driven at 583 r.p.m. by a 20 hp. motor. This fan handles 14,000 c.f.m. — 8,000

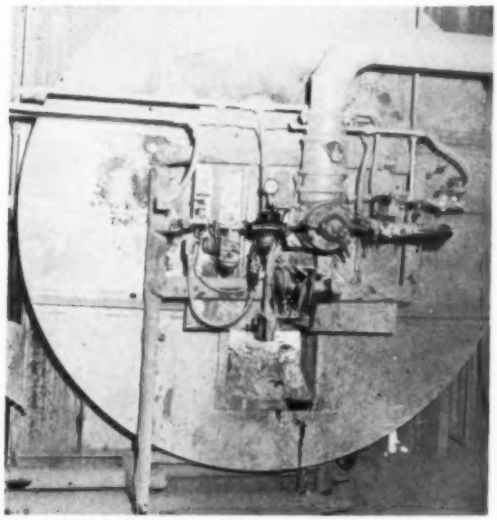
c.f.m. from the drier and 6,000 bleed-in air ahead of the fan. Air is exhausted to atmosphere through a steel stack.

Dust from the dust chamber and the cyclones is carried by a screw conveyor (No. 1) to a cross screw conveyor (No. 2), which also receives the discharge from the drier. Another screw (No. 3) and a bucket elevator (No. 2) feed the dried material to a screw conveyor (No. 4) on top of the bin structure. This screw can discharge at an intermediate point (Gate 3) to a pair of 4- by 8-ft. Tyler Hum-mer 2-deck screens with 4- and 8-mesh wire cloth, or from its end to a 14-ft. dia. Gayco mechanical separator. The coarse from the separator always goes to the screens, and the coarse from the screens can go to a pulverizer in closed circuit.

When all the material goes first to the separator, the coarse going to the screens does not contain enough fines for agstone. When all the feed goes direct to the screens, the fine No. 30 and 40 products cannot be made. The usual procedure, therefore, is to split the direct feed in the desired proportions between the separator



Left: The dust collector, fan, and duct at the feed end of the drier.



The hood and burner arrangement of the 6- by 50-ft. oil-fired rotary drier.

Below, left: The 14-ft. mechanical separator and the two 4- by 8-ft. screens which do all the sizing.

Below, right: The vibrating feeder from the bin (above) to the grinding mill. This unit reduces ½- or ¼-in. to 8-mesh material to minus 6-mesh.

and the screens, with the coarse from the separator going to the screens. The fine product from the separator —Grade 30 or 40, depending on the adjustment of the separator blades —goes *via* an Airslide to 100-ton compartments 2A and 2 and 160-ton compartment 3 of the 6-compartment 710-ton capacity bin structure.

When the sizing circuit receives only material from the drier and this is all fed to the separator, the output is 14 percent of Grade 40 or 30, 58 percent of Grade 10 (agstone), and 28 percent is rejects for the Bradley mill. When the material comes both from the drier and the mill, the output is 30 percent of Grade 40, 58 percent of Grade 10, and 2 percent rejects. By adjusting Gate 3 on screw conveyor 4 to change the split of material going direct to the separator and the screens, any desired percentages of Grade 40 and Grade 10 between the above limits can be obtained.

The screen oversize—8-mesh to ¼- or ½-in. as the case may be—is chuted to a 15-ton surge bin from which a Syntron feeder discharges to the Bradley Type B Junior Hercules mill. This is driven through V-belts by a 100-hp. motor and usually grinds to minus 6-mesh at the rate of 8 to 12 t.p.h. When conditions require, 4- or 8-mesh screens can be substituted in the mill. This material is returned to the separator and screens in closed circuit *via* screw conveyors 3 and 4 and elevator 2.

The 4- to 8-mesh material off the bottom decks of the screens goes to 150-ton bin No. 6. The minus 8-mesh material through the bottom decks of the screens goes to 100-ton bins 4 and 5 as Grade 10 or agstone.

Air is drawn from the mill, elevators, screens, packer, etc., through a Western Precipitation Cyclotrell collector through a 5 hp. fan. The dust collected goes to Bin 4 with the Grade 10 product.

The system for reclaiming various sizes from the bins is very flexible and allows for reprocessing, bulk loading, and bagging. Agstone can be drawn from bin 4 through one of two screw feeders (No. 10) and 4- to 8-mesh material from bin 6 through one of two gates (No. 2) to screw conveyor 7. Agstone can also be drawn from bin 5 through two screw feeders (No. 11 and 12) and 4- to 8-mesh material from bin 6 through gate No. 1 to screw conveyor No. 8.

Both screws 7 and 8 discharge to transverse screw conveyor No. 9, which is reversible and can discharge at three points. At the south end it discharges any of these materials, but usually agstone, for direct bulk truck loading and at the north end for direct bulk car loading. A discharge point at the center is used only for returning 4- to 8-mesh material to the Bradley mill bin *via* screw conveyor 12 for reduction.

The agstone in bin 4 can be fed by the second screw feeder (No. 9) to screw conveyor 11. A transverse screw conveyor (No. 6) feeds to the Haver & Boecker Type 4BBX 4-tube automatic bag packer. The Grade 30 material in bin 2 is fed by screw feeder 6, and that in bin 3 by screw feeder 5 to screw conveyor 6 to the packer. The Grade 40 material in bin 2A goes *via* screw feeder 7 and conveyor 6 to the packer.

Loaded bags are carried on a rubber belt conveyor to a Power Curve flexible conveyor. This is reversible for loading trucks at one side of the building and cars at the other, and is sectional to curve into the cars. A spillage recovery system of screw conveyors No. 10, 13, and 14 feeds back into the circuit *via* elevator No. 2.

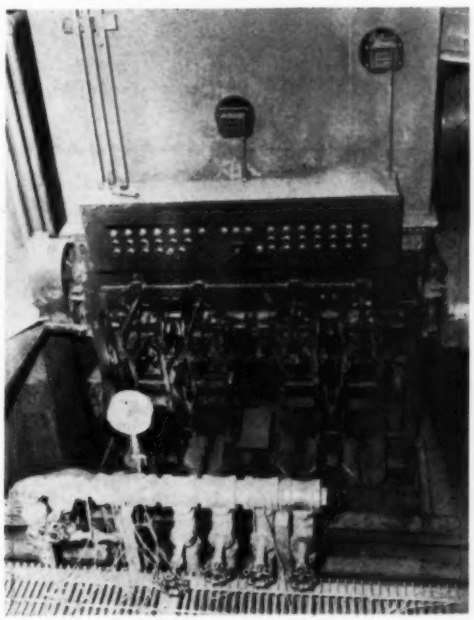
These products are packed in 80- or 100-lb. bags as customers prefer. These are multi-wall bags made by Continental Paper Products Ltd., a subsidiary of the Canadian International Paper Co.

For bulk loading to cars Grade 30 material is drawn from bin 3 by screw feeder 4 and is discharged *via* Airslide No. 3 to cars. Grade 40 material is drawn from bin 2A by screw feeder 8 and goes *via* Airslide No. 4 to cars.

For loading either Grades 30 to 40 to bulk trucks, the feed hopper of the packer is allowed to overflow to Airslide No. 6.

The plant is designed for ease of control and requires only three men per shift—one to operate the plant and the other two for bagging and loading. There are four control boards—for the main circuit, the regrind circuit, the packer and the burner, etc.—from which all equipment is pushbotton-controlled. The surge bin feeding the drier and also the packer bin have upper and lower level Bindicators. The Bradley mill feed bin has three-level Bindicators for even closer control. Each of the six storage bins has an upper level Bindicator.

This plant is a part of the Industrial Materials Division of G.L.&A., which is headed by D. C. Nickle, vice-president and general manager. W. G. Smith is plant manager for all the Beachville operations.



The 4-tube automatic bag packer from which cars or trucks are loaded. Note the bin level indicators above.

Minnesota Aglime Producers To Support More Experiments

At the annual meeting of the Minnesota Limestone Producers Association held recently in Minneapolis, a new set of bylaws was adopted, and action was taken to continue to support experiments with agricultural limestone at the University of Minnesota.

During the session the following officers and directors were elected for 1960: president, Donald Stussy, Stussy Construction Co., Mantorville; vice-president, Clarence Nielsen, Hector Construction Co., Inc., Caledonia; scretary-treasurer, Dean Gaulke, Patterson Quarries, St. Charles. New directors are Arthur Bustad, Martin Bustad & Son, Austin; Leland Osmundson, Osmundson Brothers, Adams; and John Patterson, Patterson Quarries, St. Charles.

Samuel Omasta, vice-president of the National Limestone Institute, Washington, D. C., brought the Minnesota group up to date on events in the nation's capital concerning the Agricultural Conservation Program and the status of the highway program. In reviewing the agricultural picture, Mr. Omasta indicated the national program would have the same scope in 1961 as at present, despite the budget recommendation to reduce it to $100,000,000.

With respect to the highway program, Mr. Omasta informed the M.L.P.A. of Congressman Fallon's bill to restore the funds to$925,000,000 for ABC highways in 1962 and 1963. He anticipates that a bill will be introduced to increase the appropriation by $25,000,000 each year, as proposed in the 1956 Highway Act.

At the second day's session, Merle Avery, Agricultural Stabilization Committee program specialist, outlined the 1960 conservation program and said that aglime tonnage had dropped off in 1959 because extremely wet weather made it impossible to spread it on the fields.

Dr. A. C. Caldwell, professor, department of soils, University of Minnesota, spoke on the place of agricultural limestone and calcium counteracting the effect of atomic fallout. Dr. John Grava, an associate of Dr. Caldwell, briefed the group on the testing and quality of agricultural limestone in the state. Dr. Grava advocated the assembling of more data on the testing and quality of liming material which passes through the 50-mesh sieve.

Dr. W. P. Martin, head department of soils, University of Minnesota, spoke on new aglime experiments in Minnesota, as well as in other states.

One of the highlights of the meeting was the banquet on Thursday, which was attended by more than 100 members and guests.

Newly elected officers of the Minnesota Limestone Producers Association are shown here with convention keynote speaker Samuel Omasta, vice-president, National Limestone Institute, Washington, D. C. From left to right they are: Mr. Omasta; Don Stussy, president; Clarence Nielson, vice-president; and Dean Gaulke, secretary-treasurer.

Permanente to Spend $16,000,000 In 1960 for Work on New Plants

Permanente Cement Company will invest approximately $16 million for new and improved facilities in 1960, compared with $10,337,000 in 1959. Included in this sum are expenditures for the completion in August of a cement plant near Honolulu, Hawaii, and the completion in May of a gypsum products plant in New Mexico.

However, it does not include the proposed gypsum products plants announced earlier this year when industrial waterfront properties were optioned in Houston, Tex., and Jacksonville, Fla. (See PIT AND QUARRY, April, 1960, p. 43.)

A major effect of the Hawaii plant and the purchase and recent expansion of the Olympic Cement plant at Bellingham, Wash., will be a reduction in the need to ship cement to these areas.

Michigan Limestone Division of U.S. Steel recently honored two employees at a dinner in Rogers City, Mich.—LEWIS J. PATTERSON, former northern district manager who was named vice-president at another U.S. Steel subsidiary, and RUDOLPH C. DUELTGEN JR., who was assistant to the district manager and is now retiring. Mr. Dueltgen was with the firm over 40 years.

JOHN THOMAS ELLERBECK, 61, formerly superintendent of Utah Limo and Stone Company, Salt Lake City, died in February in a Tooele, Utah, hospital of a heart ailment. He was superintendent of the firm from 1938-1952, and was a testing engineer for the last seven years.

"I'm a bag that gets knocked around a lot in my business."

"Me, too. And I don't think I could stand it if Chase didn't know how to pick the paper!" Fact! Chase buys all these types of paper on the open market: stretchable, non-skid, creped or regular kraft...fully bleached, semi-bleached and colored outer sheets. This means Chase has the pick of the best from *many* sources. Result: Bags with maximum strength, minimum bulk, more value for you. You pay no more for the *best* bags, beautifully printed. Make sure you get them—from Chase!

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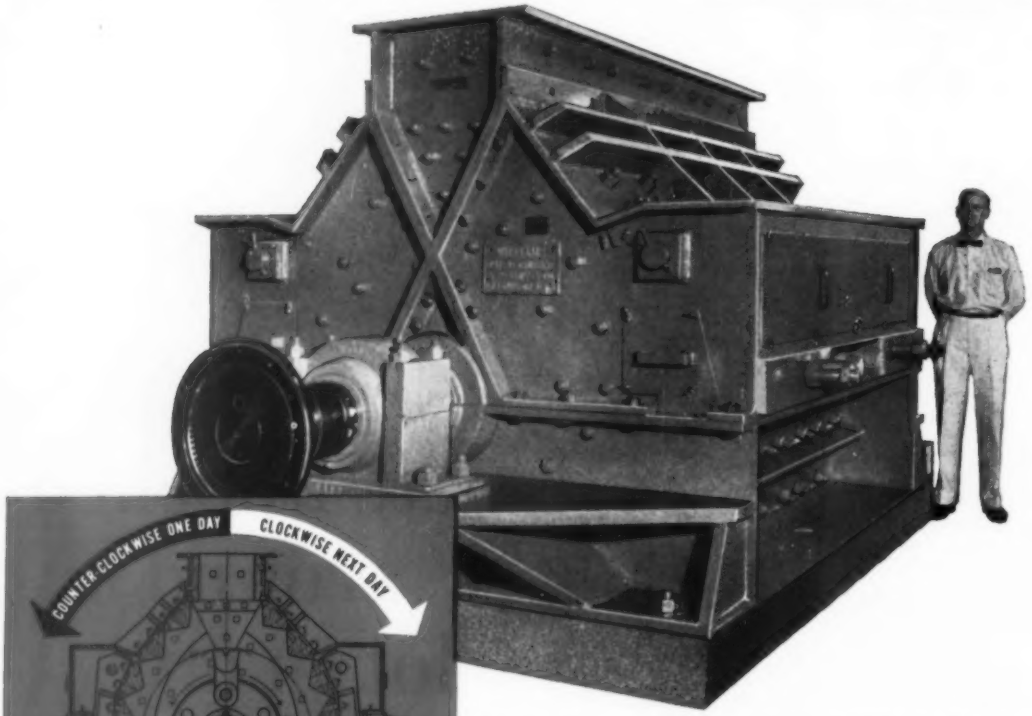
More efficient CRUSHING AT LOWEST COST for labor, power and upkeep with WILLIAMS REVERSIBLE IMPACTOR



REVERSIBLE ROTATION prolongs parts life without manual adjustment. A simple reversing switch on motor does it.

INTERIOR VIEW of small Impactor shows typical rugged hammers, impact blocks and liners made of manganese steel and other alloys. Rotor removable without disturbing feed or other mechanisms.

For secondary crushing, the economy and high production of a Williams Reversible Impactor is unequalled, whether raw material is hard and abrasive or soft and friable. Precision control of specified top-size is easy, usually in a closed circuit system, from a coarse 2" with minimum fines, down to 35 mesh or finer.

The Impactor has no grates. Material fed into the mill is reduced to proper size while rebounding between the whirling hammers and impact blocks, until discharged from bottom opening. Grinding or rubbing action is eliminated—power, replacement parts and downtime are reduced to a minimum. No fine adjustments need be maintained.

Reversible rotation is a prime feature of the Williams. So is *Wide Open Accessibility* to interior. So are the *Interchangeable Impact Blocks* to balance wear. So are the many other exclusives that hold cost-per-ton to the very lowest. There is a size and model for your exact needs. *Write for catalog.*

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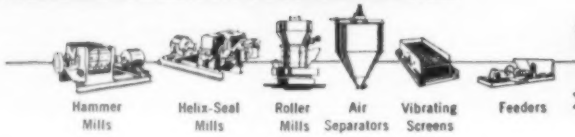

WILLIAMS
CRUSHERS GRINDERS SHREDDERS
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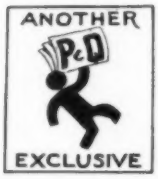
Let's Look at Lime

A specialist discusses promotion, popular fallacies, industry problems and needs, possible solutions

By **WINSTON A. WAY**
Extension Agronomist
University of Vermont



LIME for conservation, lime to correct acidity, and lime to farm efficiently are three ideas which have been advanced for more than 50 years to encourage greater use of agricultural limestone. On the basis of past and present performance, one can conclude that progress has been made. However, present usage in the Northeast leaves much work to be done in terms of goals set forth by agronomists.

Education might do the job. Subsidies have been shown to be effective; but not until the *limestone industry* gets behind a modern promotional campaign will the situation really improve.

The present system has been in effect in New England since 1936, but there has been no real increase in usage, except for the ups and downs due to war and a changing Agricultural Conservation Program.

Farmers in Vermont used a record 118,000 tons in 1944, but they have averaged less than 80,000 since that time. One must conclude either that the agronomists, who estimate 300,000 tons as the annual goal, are unrealistic, or that farmers are not apt to achieve the tonnage they should use under our present promotional system.

It could be argued that as poorer land is abandoned and better land is used more intensively, the present tonnage will come nearer and nearer to the actual needs. Let us assume that 2 acres instead of the present 3 acres will feed each of Vermont's present 345,000 animal units, and that 500 lb. of lime will replace annual losses. It would then appear that 175,000 tons will eventually be about our normal requirement. Perhaps farmers are now using enough lime on their better acres and figure that it is unprofitable to lime acres which will not be needed in 1975.

In the meantime we can prove by soil tests that the average farmer (if there is such a person) is using far too little for his present acreage. He may think that he has spent a lot for lime; he may think he is doing a good job of liming. But perhaps he has actually been standing still. Leaching losses have removed lime about as fast as it has been added. The average farmer has kept his soils from becoming more acid, as they might well have been without lime, but his soils are still too acid for best crop growth.

Increased use of nitrogen is fast becoming an important source of acidity, which must also be considered. Therefore, at least until 1975 there will be opportunities galore for a concerted co-operative effort to promote the use of lime. This will require the best efforts of our limestone industry, working with agricultural colleges and members of the seed and fertilizer industries.

(Turn page)

Winston Arthur Way, extension agronomist, the author of this article, has been with the extension agronomy department at the University of Vermont since 1954. He has prepared several publications dealing with agronomy and has assisted in stimulating greater interest in this subject among county agents through training sessions.

Mr. Way took his undergraduate work in forestry at Syracuse University and pursued his graduate studies in agronomy at the University of Vermont. He was employed by the Soil Conservation Service, Washington County, New York, and subsequently became an instructor in agronomy at the University of Vermont. He has served as chairman of education and publicity for Vermont's Green Pastures Program.

To make farmers happy with lime and to encourage farmers to use more of it, sell them on the value of alfalfa. Joint advertising, as carried on by the concerns on the signboard, helped to grow a stand of alfalfa where alfalfa had never grown before. (Weedy material in the foreground is roadside vegetation outside the plot.

Promotion—Everyone's Responsibility The present lack of promotion on the part of the limestone industry has left the burden upon these others. As a result, there has been no definite program above the individual producer level; and at times it would appear that the fertilizer and seed industries do more lime promotion than does the lime industry.

Fertilizer people have a real interest in helping farmers use lime, for without lime they are unable to demonstrate the value of fertilizers. Availability of nitrogen and phosphorus in particular are tremendously benefited by a favorable soil pH. As a result, most fertilizer promotion advocates a strong liming program, based on soil tests.

Seedsmen, too, know that lime is needed to exhibit the potentials of new varieties. What farmer can take advantage of high-yielding alfalfas, ladino clover, or even a high nitrogen grass crop, without first attending to the lime requirement of his soil? Seed promotion almost always gets in a plug for lime.

Incidentally, did you ever try to find a film showing how lime works in soils and how it benefits crops? There are none available! By contrast, you could borrrow a dozen films or more on fertilizers, and perhaps another dozen on seeds. It seems a pity that our huge limestone industry hasn't one good movie explaining the virtues of its product. Imagine the frustration of county agents and other farm leaders who find such an important educational phase of farming almost neglected by the very people who have so much at stake. It is not surprising that so many agricultural workers throw up their hands in despair with a "Why should I try?" attitude!

So Far So Good Past use of lime, although inadequate, has made a substantial improvement in New England agriculture. Vermont's increase in alfalfa acreage is a good example. In 1900 there were only 38 acres. By 1920 this had increased to 1,765 acres; in 1940 it was 13,525; and in 1959 Vermont had 125,000 acres. Alfalfa acreage parallels lime usage, but no one could say for sure whether lime made the alfalafa possible or whether alfalfa made the lime possible. This last phrase has a bearing on future lime promotion. Convincing a farmer of the advantages of alfalfa is the best way to sell lime. Lime for lime's sake, liming to improve the soil, or liming to reduce phosphorus fixation have only minor appeal to a dairyman. Showing him how alfalfa can make more tonnage, increase the quality of his forage, and provide midsummer growth will give him enthusiasm to apply agstone.

Lime has already made thousands of alfalfa acres, which father or grandfather was convinced would not grow alfalfa. Alfalfa land at first was restricted to soils having a natural lime content. Few such soils occur in New England. The Champlain Valley is one exception. Here we find heavy lacustrine soils having free calcium carbonate in the subsoil. Yet the plow layer has a higher lime requirement than acid till soils found elsewhere.

Grandfather's failure to grow alfalfa should not be accepted as a valid excuse for not growing it today. Present knowledge about lime, fertilizers, and improved varieties of alfalfa demand a more optimistic point of view. Even poor drainage, which is the only real excuse for not growing alfalfa, has less meaning today. The Soil Conservation Service can assist in draining land. Leveling will eliminate surface depressions. A variety such as Narragansett will tolerate poorer drainage.

At present we have more acres of alfalfa land than grandfather ever imagined. These are capable of forage yields he never thought possible. Present success should serve as a stimulus for still more acres. This increase, in turn, would open new vistas for agricultural limestone sales.

Common Misconceptions Lime has so long been associated with correction of acidity and soil pH that farmers are overschooled on correcting soil acidity, to the exclusion of secondary benefits, which are also helpful.

The influence of lime on soil organisms, its effect on nitrogen-fixing bacteria, and its promotion of root development have been too little publicized. Most farmers cannot quite comprehend the benefits of limestone to build-up of organic matter and the resulting increase in nutrient exchange capacity. Moisture-holding ability, soil structure, and aeration are likewise improved.

These attributes of lime are difficult for nonprofessional people to understand, especially since the improvement accrues so slowly and over such a long period of time. A more dramatic method of explaining these benefits to farmers is needed.

Even methods of measuring acidity are not easy for the layman to comprehend. The use of the symbol pH, with small numbers indicating greater acidity than high ones, is confusing. Unfamiliarity with the implications of logarithms makes an understanding of pH impossible. Many farmers are content to rest on their laurels after raising a soil pH from 5.0 to 6.0, thinking that they are just one number away from the magical 7.0, while in reality their soil is ten times too acid.

Changing Concepts Lime was once considered necessary only for the growth of legumes. Today a new philosophy of "lime for

all forage crops" is generally shared by agronomists. While it is true that some crops will exist on more acid soils than others, it should be emphasized that, in addition to existence, farmers want *persistence* and *production*. The latter two qualities are possible only in an adequately limed soil.

Because of the indirect effects of liming previously discussed, the *Vermont Agronomy Guide* suggests a pH of at least 6.5 for all forage crops, including corn. Nearly all land on New England dairy farms is seeded periodically to a legume-grass mixture. Thus, the most practical pH level is that needed for the most demanding crops—alfalfa, trefoil, or the clovers.

Even if legumes weren't seeded, it would be good business to maintain a pH of 6.5 for grasses. This level will enhance the value of nitrogen fertilizers, help release nitrogen from organic matter, and counteract luxury consumption of potash.

You might think that maintaining a high pH will waste lime. This may be true; but leaching, the largest single loss, will remove more calcium from a well limed field than from a field only half limed, by virtue of there being more to leach out. If you remember that lime is an inexpensive commodity, compared to other input such as potash, it should not be too difficult to see that a farmer is jusified in being extravagant and inefficient with some things like lime in order to become more efficient with others. It is good business to use lime inefficiently.

Agronomists should not be too zealous about the recommendations given for lime. We all know there are best ways and best times to apply it. Most of these are concerned with initial applications in which quick results are needed for survival of new seedings. Fineness of grind is a legitimate quality needed for this purpose. Vermont suggests liming before corn for the new seeding to follow a year later.

Once pH has been raised to a desired level, there need be no complicated directions for adding maintenance applications. *Lime Any Time*, a new Vermont Extension Service publication is designed to promote this idea, which not only benefits farmers but also suppliers, who somehow can never keep up with the demand in the early spring. There are other times to apply lime than just before seeding. The need to apply lime is greater than the need to be concerned about how or when it is used.

Lime—a Capital Investment Credit may not generally be considered a problem. However, there is need for a more lenient lending policy toward lime. Farmers are finding that recommended amounts of lime have fallen short of bringing their soils to an optimum level. A traditional application of 2 tons is seldom enough to meet modern standards. Actually, 4, 6, 8, or more tons are often required. Obviously, this would be a large amount to apply at one time; and it is generally added over a period of two rotations. By plowing down 2 tons and discing in 3 more tons, there is no reason why a farmer cannot use as much as 5 tons in a single season.

Benefits from initial applications are certain to be spread over many years. It therefore seems unreasonable for credit agencies to look upon lime as a cash expense. Most farmers are saddled with so many bills when they acquire their farms that the cost of initial lime treatment cannot be met. The result is a compromise application of 2 tons per acre to fit the pocketbook, instead of an application fitting recommendations based on soil tests.

Many a recommendation has been tailored to fit the economics of an individual. There is always the fear that a 5-ton recommendation will so discourage a farmer that he won't apply any.

Banks are not afraid to loan more money on "good land" than on "poor land." If lime is a part of what makes good land, why can't they recognize that poor land plus lime might become good land? Applied lime becomes a part of the quality of the land, just as though Nature had put it there. Why not consider limestone a capital investment with the previlege of long term credit and let more farmers start off properly instead of settling for an inadequate liming program as another cash expense? The farmer who has alfalfa soil to start with, whether it be natural or man-made, is fortunate.

Future Aspects Future success in lime sales would seem to depend on a solid educational-promotional effort, rather than on a legislative program which vacillates from year to year and may be terminated at any time. Non-farm voters are becoming increasingly more powerful and are apt to look less favorably upon farm programs than in the past.

Legislative programs are not now doing an adequate job of promoting liming; and, whether they are continued or not, they should be accompanied by a major industry promotional effort.

Limestone is a legitimate product urgently needed by all farmers who expect to remain in business. Limestone is basic to our crops and livestock industries, and in the Northeast farmers should be given lime priority over fertilizers and new varieties of seeds.

Declining sales of seeds due to longer-lived stands, and increasing competition within the fertilizer industry will certainly cause these groups to limit future promotional activities.

Extension services are, of course, obligated to carry out programs in the best interests of farmers, and they will continue to be concerned about the lime situation. It is quite likely that they prefer to work with industry groups which display some initiative in solving their problems. We look forward to greater support from groups which represent agricultural limestone.

Promotion Needed There are those who say there is too little money in lime to provide the necessary promotional funds. It has never been quite clear whether this had reference to national sales or the price per ton.

Certainly, an industry which sells more than $80 million worth of a product can find enough money to promote this product. Thousands of concerns make a good showing with more limited resources than those of the limestone business.

If price or profit per ton is the criterion, and if there truly is not enough money to promote lime, the selling price should be raised to cover it. Farmers are used to paying both advertising and service on nearly every product they buy, from automobiles

(*Continued on page 134*)

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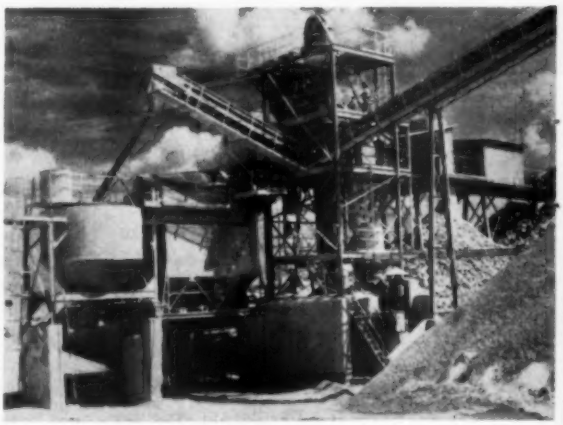
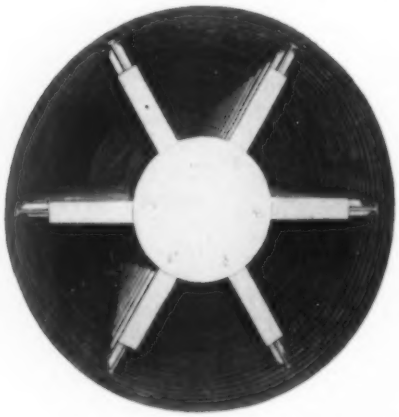
While discussing lime plant machinery, ask our engineers about KENNEDY's new and exclusive electronic computation of calcining systems. This modern mathematical concept replaces trial-and-error and rule-of-thumb approaches with a fast, accurate, fundamentally sound technique.

KENNEDY Stone Preparation Machinery



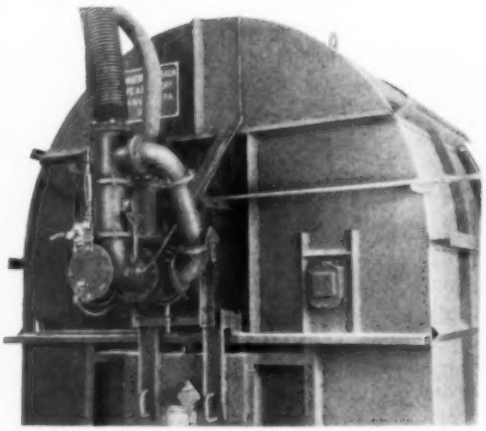
Jaw crushers, impact breakers, gyratory reduction crushers, screens and conveyors—each noted for its dependability—can be integrated for the balanced output of correctly graded stone sizes.

KENNEDY Internal Heat Recuperator



The "MULTIVANE" scientific configuration of alloy steel vanes provides maximum transfer of heat and movement of material. Can be adapted to existing installations with a minimum of downtime.

KENNEDY Kiln Firing Systems

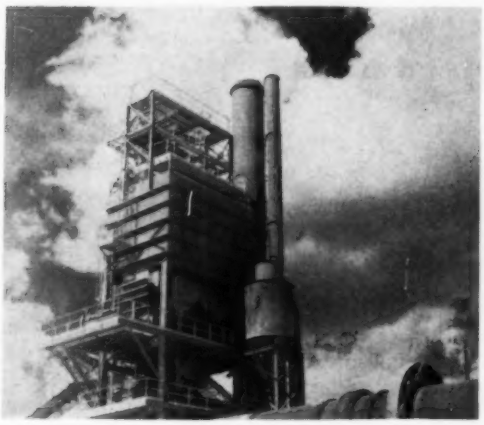


KENNEDY Firing Systems feature coal, gas, oil or combination burners and effective hood-to-kiln seals which minimize air leakage and maintain optimum firing conditions.

Primary & Secondary Gyratory Crushers • Jaw Crushers • Roll Crushers • Impact Breakers • Hammer Mills • Rod & Ball Mills • Kilns & Kiln Accessories • Dryers • Scrubbers • Screens • Pneumatic & Mechanical Conveyors • Complete Crushing, Lime, Cement & Carbon Paste Plants. Research & Testing Service.

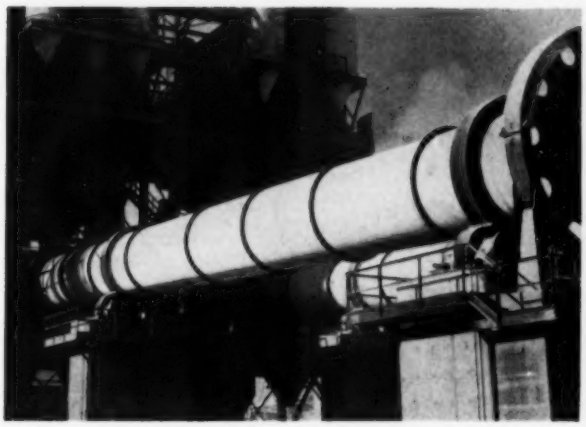
KENNEDY lime plant equipment

KENNEDY Stone Preheater



Puts kiln exit gases to work to partially calcine feed. The KENNEDY Stone Preheater makes the rotary kiln the most economical producer of high quality lime.

KENNEDY Short Rotary Kiln



KENNEDY heat-saving auxiliaries make long kilns unnecessary. There is less kiln to buy and maintain; there is less brick — fewer foundations; alignment is simpler.

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A single, attractive cubicle houses all instruments essential to system control. Each is factory-assembled and checked to simplify installation and insure efficient overall operation.

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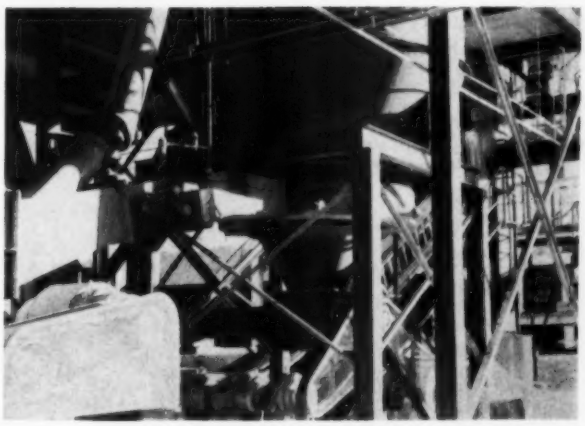

Further economies are achieved by the highly efficient transfer of heat from the discharged lime to the combustion air, while rapidly lowering lime temperature. Unit requires little headroom.

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EUROPEAN LIME MANUFACTURE

An evaluation featuring the most recent German mixed-feed kilns

ROBERT S. BOYNTON
General Manager
National Lime Association

ANOTHER P&D EXCLUSIVE

THERE is one all-encompassing difference between European and American lime manufacture — namely, the cost of fuel. Until very recently, European lime plants have been limited in fuels either to coal or, in areas where smoke abatement is enforced, to coke. Unlike the U.S., there is no natural gas. Fuel oil, while available, has always been very costly —much more so than in the United States.

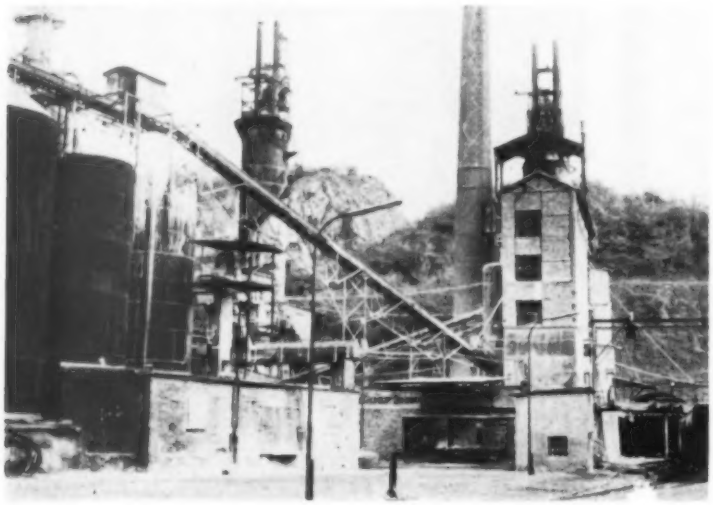
Yet, very recently, a few European operators have started to use fuel oil in place of coal or coke because of the latter's scarcity or high and steadily rising costs. In most sections of Europe the delivered cost of coal averages at least twice the sales price of quicklime per ton. In the Ruhr section of Germany, this means the equivalent of $20 to $23 per ton. Consequently, the major emphasis in European lime research production and kiln design is fuel economy. In fact, the large German and British lime companies conduct continuous research on combustion and fuel efficiency and are constantly striving to lower the B.t.u. input per ton. This means that rotary kilns are rarely used in Europe for lime burning since even the most fuel-efficient rotaries require about twice as many B.t.u.'s per ton as the most efficient vertical or mixed-feed kilns.

Of course, there are other differences, too, such as labor. The average common to semi-skilled laborer in Germany is paid only 50 cents to 60 cents per hour for a 44-hour week. As a consequence, many small European plants seem very old fashioned, and produce lime with very little labor-saving equipment. On the other hand, in spite of the low wages, the largest German and English plants are highly mechanized—as much as the best American plants.

The size of two German companies, Rheinische Kalksteinwerke, Wulfrath, and Rheinisch-Westfalisch Kalkwerke, Dornap, both in the Ruhr, is amazing. They are the two biggest burned-lime product companies in the world. It is a moot point which is the larger. They are very nearly the same size, and both have about 2 million tons annual capacity, excluding large sales of limestone.

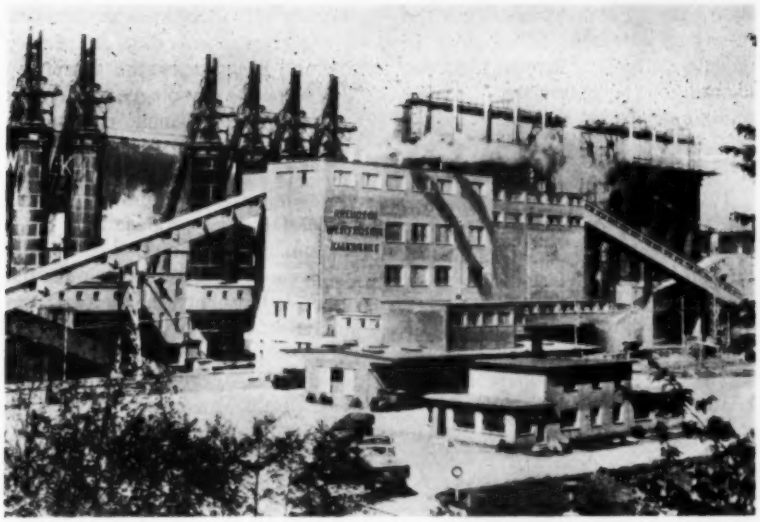
Imperial Chemical Industries of Great Britain is probably third in size among lime producers in Europe, but it is well below the production of these two German companies. Germany also has some highly efficient medium-sized companies, like the Hohenlimburger Kalkwerke, Hohenlimburg, Westphalia, which operate about the same type of mechanized high-capacity, mixed-feed kilns. However, they don't have nearly so many as the "big two."

Modern Seegar mixed-feed kilns at the medium-sized plant of the Hohenlimburger Kalkwerke, Westphalia, Germany.



ROTARY KILNS

The major rotary kiln lime producer is Imperial Chemical Industries



One of the several very large and efficient vertical kiln lime plants in Germany.

in Buxton, England, which operates two large conventional rotaries along with several large batteries of shaft kilns. I.C.I.'s installation of rotary kilns for the first time about 6 years ago was largely motivated by the desire of management to balance out its vast quarry operation and permit the utilization of small stone (½ in. to 2 in.) as kiln feed instead of selling it to uncertain and low-profit stone markets or adding it to the spall pile.

Furthermore, management of I.C.I., the largest chemical lime supplier in the United Kingdom, as well as for its own captive use, desired to produce a more reactive lime with less core, both of which are features inherent in the rotary kiln.

Other rotary kilns in Europe are Stora Kopparberg, a Swedish steel company, a purely captive lime plant with two 270 ft. F. L. Smidth rotary kilns; another modern rotary kiln plant in Finland that is largely captive; some operations in Denmark with small-sized (100- to 125-ft.) kilns; and a recently installed Lepol kiln in Belgium. Should there be further expansion of rotary kilns in Europe, it is probable that the Lepol kiln will be favored because it provides the greatest fuel efficiency. Its performance in European cement manufacture has been outstanding to date.

VERTICAL KILNS

The varieties of vertical kilns used in Europe greatly exceed Heinz's proverbial "57" varieties. There is literally every conceivable type, with countless, usually individualized, modifications. The installations run the gamut from small, primitive field kilns; Dutch ovens; old fashioned stone masonry mixed feed to extremely large, modern, mechanized mixed feeds; modern Azbe gas-fired kilns with center burners; Priest kilns of various sizes; and, of course, many of the old standard steel-shelled vertical kilns. Many of these types are highly efficient in fuel consumption. Azbe kilns in Norway, Sweden, and Austria, in particular, are among the most efficient in Europe from the standpoint of fuel economy and lime quality.

However, the kiln that is the most interesting, since there is nothing quite like it in America, is the newest, high-capacity German mixed-feed kiln, a highly modified version of the Seeger kiln.

GERMAN MIXED-FEED KILNS

Most of the largest German lime plants are currently using a mixed-feed kiln that approximates the following kiln design, which was developed in 1957:

Inside diameter—14.8 ft.
Inside sectional area—171 sq. ft.
Kiln height—94½ ft.
Useful height of kiln—90 ft.
Thickness of kiln lining—2 ft. 7½ in.

The capacity of the above dimensioned kiln, which is being successfully operated, is about 250 short tons per day, or 1½ tons per sq. ft. of kiln area. The size of the kiln feed charged to these kilns ranges between 2½ and 7 in. Closer classification of stone sizes is achieved, so that a range of, say 3½ to 4⅔ in., is fed into one kiln while in an adjoining kiln the stone is about 4⅔ in. to 7 in. The Germans have found, as in the case of American rotary kiln practice, that the quality of the lime and capacity of the kilns is improved through narrower classification of kiln feed. Encouraging experimentation has been conducted on burning small stone of 1- or 2½-in. size in these same mixed-feed kilns. Commercial production of such sizes is visualized in the future, with an anticipated reduction in fuel consumption.

The unique feature of these kilns is the fully automatic overhead charging system. Both stone and pulverized coke are fed in precise amounts by weight by a movable charging hopper feeder with retracting bottom gates into the tops of the tall kilns at regular intervals. The coke is even fed in a rotating manner, so that the layer of fuel is evenly distributed over the layer of stone.

These kilns have no preheaters because of their great height, but there is a thorough recirculation of waste, hot gases which serves to preheat the incoming stone. The calcined quicklime passes through an extremely efficient cooling zone, so much so that the quicklime lumps can be held comfortably by hand at the point of discharge. A novel ring discharge system consists of two ring plates. The lime is knocked off by a

rotating stripper into a bin below and onto conveyor belts for grading. In all, the charging, calcining, and discharging is accomplished with the minimum of manpower.

QUALITY OF LIME

From an American standpoint, these mixed-feed kilns have only one disadvantage. The core content is high, at least in comparison to American rotary kilns—an average of about 2½ percent—on bad days 4 percent, and on good days between 1 and 2 percent. Apparently, the German chemical lime users are not as exacting in their lime specifications as Americans—or they are simply tolerant because of the extremely high fuel costs that plague all German industry. The Germans can reduce their core content but only at a sacrifice in fuel efficiency, which means higher-priced lime.

The Germans produce both high-calcium and dolomitic lime. In the big Ruhr lime producing area, the largest in Germany, the high-calcium stone used by large plants ranges between 96 and 98 percent $CaCO_3$. Nowhere in Germany were there reports of dolomite as pure as those in the northwest Ohio area. The following is a composite analysis of quicklime from several analyses received.

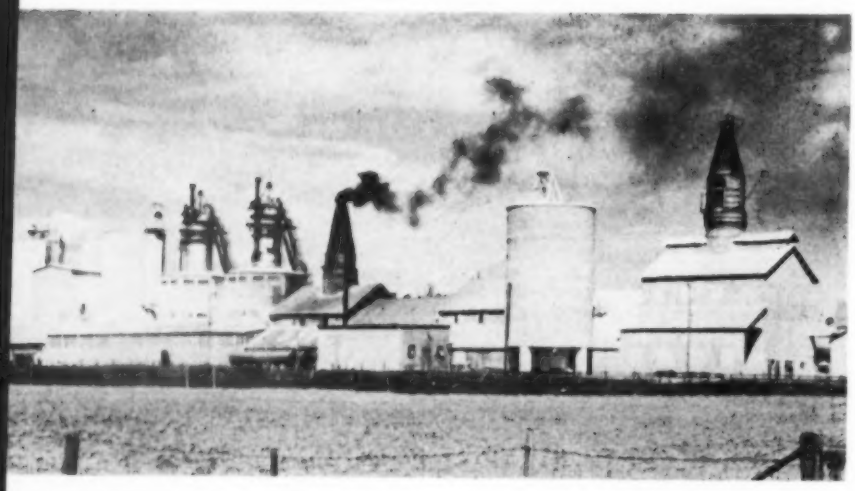
CaO	94.14%
MgO	1.06
SiO_2	1.09
Al_2O_3	.48
Fe_2O_3	.53
SO_3	.21
CO_2	2.33
Free CaO	92.32

The range of chemical analyses on free CaO was from 89 to 95 percent and on core from 0.85 percent to 4 percent. In spite of the mixed feed the lime, both quick and hydrate, is not discolored and is not contaminated with ash.

One difficulty confronting some large German companies is that their quarries are interlaced with irregular thin horizontal seams of clay loam that can be beneficiated only in expensive and elaborate washing plants with huge mud thickeners (regular flotation systems). At the Buxton quarry of Imperial Chemical Industries somewhat the same problem is encountered. However, this stone-washing plant appears more compact and proportionately less costly in capital equipment than that of the Germans, which is spread out over an extremely large area. In fact, in one German plant the stone is actually washed twice. Thus, it takes considerable processing to obtain the kiln feed.

However, the stone-crushing and classification plants are ultra modern and closely resemble the best American stone plants. Conveyance of stone from the quarries to the primary crusher is entirely by truck, some of which carry 40- to 60-ton pay loads. The Germans utilize side-dump trucks instead of rear-dump units.

Left: Modern high-capacity kilns at the Wulfrath Limestone Works.



Below: Vertical kiln lime plant of Stra Kalkbruk, Sala, Sweden. Note the various types of mixed-feed kilns.

FUEL EFFICIENCY

The lowest fuel input reported in Germany (which is probably the lowest in the world) is 1,476 B.t.u.'s per lb. or 2,952,000 B.t.u.'s per ton. This is only for the smallest-sized stone of 60 to 90 mm. (2½ to 4 in.). For larger sizes, the best fuel figures were:

4 in.-5¼ in.—3,114,000 B.t.u.'s per ton

5¼ in.-7¼ in.—3,204,000 B.t.u.'s per ton

The above lowest fuel figure is cal-

culated by the Germans to be 85 percent of theoretically perfect calcination. They believe that further reduction in fuel is attainable up to 91.9 percent of theoretical by burning smaller stone, but presupposing that heat losses through the kiln shell are almost nil and that there is no loss of carbon monoxide. A B.t.u. breakdown on such Utopian lime calcination is as follows in B.t.u.'s per lb.:

Calcining heat	1,355
Wall losses	19.4
Evaporation of moisture in stone	21.6
Finished product loss	16.2
Unburned matter	16.2
CO loss	None
Lime loss (as dust)	7.2
Waste heat loss	39.6
Total heat	1,476

$\therefore$ Thermal efficiency is

$$\frac{1{,}355 \times 100}{1{,}476} = 91.9 \text{ percent}$$

Contributing greatly to this stellar fuel efficiency is the thick, insulated thickness of the kiln walls—2 ft. 8 in. total thickness. From inside to outside in sequence are the following components of the kiln shell: refractory lining (dolomite or basic brick), chrome magnesite granules (less expensive fire brick), another type of higher porosity fire brick, Sterchamol (brick with diatomaceous earth), and ¾-in. steel plate. Such linings have very long life of about 4½ years or 225,000 tons of lime production.

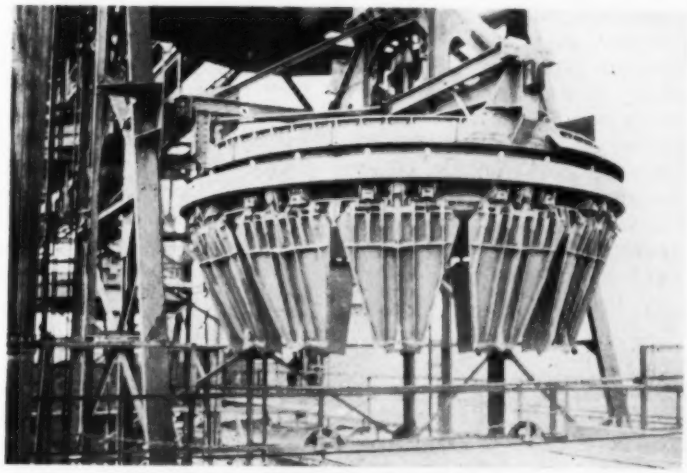
Another factor helping efficiency is uniform-sized coke. A blend of coal briquettes and coke is employed having an average calorific value of 9,600 B.t.u.'s per lb. Of course, in other types of foreign kilns producer gas from coal is commonly employed as fuel.

PLANT APPEARANCE

Dust control practiced by some large German plants must be at optimum efficiency (99+ percent) as at the Rheinische Kalksteinwerke at Wulfrath in the Ruhr. This plant, one of the world's two largest, is located in a small German town with a population of about 10,000. It is the main employer in this town, having nearly 2,000 employees, including the office staff.

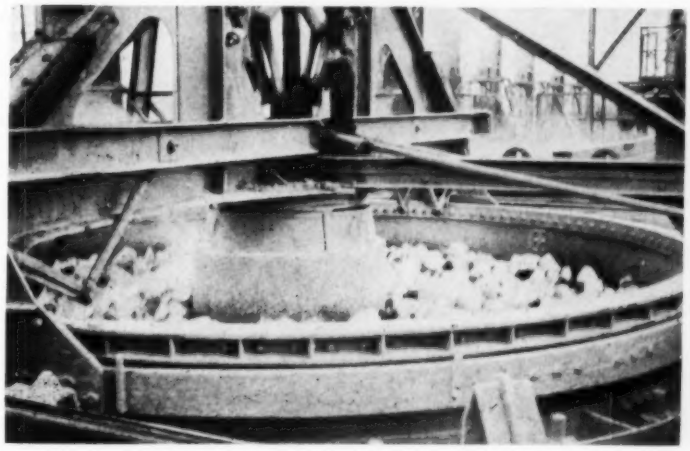
Because coke is largely used as

(A) Fully automatic overhead equipment for charging the newest large-capacity kilns at the Wulfrath plant with limestone and coke.



(B) The retracting bottom of the feeder here is shown open after discharging a load into the kiln.

(C) The top of the 94-ft. high vertical, mixed-feed kiln after being charged with limestone and coke.



fuel, there is no smoke. Dust from stone-crushing and pulverizing, lime burning, quicklime grinding, lime hydration, and portland cement production is largely entrapped in highly efficient, independent dust collection systems. As a consequence, the town, which abuts on the quarry and a part of the plant, is clean, quaint, and attractive—so much so, that this could be a prosperous textile mill town instead of a lime town.

Furthermore, in spite of the vastness and complexity of this operation, this relative cleanliness and good housekeeping is evident within the plant, the marshalling yard, and the quarries. The inevitable wastes from the operation are segregated in an orderly fashion. Maintenance crews are continually painting equipment and cleaning up. An active plant safety program is also clearly in evidence. This plant in appearance is a sharp contrast to some American plants and British coal-burning plants. At the latter clouds of dark, acrid smoke continually billow into the skies and the adjoining community looks grimy and unkempt from the inevitable soot, smut, and lime dust. This same cleanliness was also found in Sweden at Stra Kalkbruk's plant and limestone mine at Sala. However, everything is clean and immaculate in Sweden; the Swedes won't tolerate dirt or disorder.

NEW PRODUCTION FEATURES

In the Rheinische Kalksteinwerke there were several features so ultramodern that their counterparts cannot be found in America—at least, not in the lime, stone, or cement industries. This immense plant and its quarries cover an area of over ½ sq. mile and in places is strung along for about a mile in length with many miles of conveyor belt. In order to co-ordinate these far-flung operations, industrial TV is utilized. Thus, at a few key spots, like the central quarry and calcination headquarters, personnel can switch the TV to a series of channels covering the strategic phases of the operation such as the primary crusher, the stone classification plant, the stone washing plant, kiln charging and discharging points, hydration, etc.

Breakdowns or bottle-necks are detected and necessary communications are made instantly. Supplementing the TV is a series of varicolored lights that signal warnings of breakdowns or bottle-necks to all plant and quarry departments. In this way, mobile maintenance crews can be rushed to the trouble spot to make necessary repairs in minimum time.

At Wulfrath, apart from the plant, there is a large new ultramodern building that is used for the main office. It is a magnificent structure, with superb landscaping, gardens, a patio, and an air conditioned interior with a decor such as Dorothy Draper would be proud of. Yet, it is not frivolous; the same efficiency found in their plant is also evident there. But the building is the type one would expect of a Dow or Monsanto Chemical Company's executive office. The company also owns a large, modern recreation building which, in effect, it has donated to the town and their employees, with catering facilities, auditorium, stage, etc. In addition to business meetings, the German versions of the P.T.A. and Boy Scouts, also hold forth here. This may be the reason that this company is non-unionized.

There was not too much of interest in the hydration of lime, other than the fact that some large German plants still use large-sized batch hydrators in preference to the continuous-type hydrators. However, both types are used. In the non-continuous types, the Eirich mixer is well regarded. One German plant at Trier has licensed the Corson Miracle lime process for its dolomitic hydrated building lime. Standard air classification techniques for removing grit and core were used by all modern plants.

One very efficient and fast lime-loading system for bulk hydrate, pulverized and pebble quicklime, and cement was seen at Wulfrath. This consisted of a turntable on which independent and company-owned tank and hopper trucks could be loaded from a series of spouts connected with a large compartmented elevated silo. The truck simply backed onto the turntable. One man operating the controls moved the truck under the desired swivel spout. In this way, two or more trucks could be loading at the same time. I.C.I. also operated its own tank truck. The Germans have one type of truck with a trailer combination that hauls 27½ tons of quicklime or pulverized limestone or 18 tons of hydrate. As in the United States, there is growth of truck shipment.

The 20-ton skiphoist and motor haulage to the main crusher at the Wulfrath Limestone Works.

TESTING

Both the Dornap and Wulfrath operations maintain large, modern laboratories for quality control testing and research, including fundamental research on lime. These companies do more testing and quality control work than even the most progressive American companies. This may be necessary because of the poorer quality of their stone (laden with clay seams) and their constant pinch on fuel.

Testing includes: sampling of quicklime taken from each kiln at least once a day; sampling of each car shipment by quick test, and not releasing cars for shipment until approval is given; sampling coke every 2 hours to determine B.t.u. value, water content, etc., and from this determining the feeding rate of coke into the kilns; checking combustion gases by measuring $CO+H_2$, CO_2, and O_2; and making chemical analysis of limestone.

Depending upon the type of lime or limestone produced and its use, this testing may cover complete chemical analysis or only available lime, plus a few impurities; physical gradation; reactivity of quicklime; whiteness; and soundness for building lime. Added to this work is detailed sampling and testing of portland cement and hydraulic limes, to see that it meets German standards. As would be expected, meticulous testing was also practiced by I.C.I. in England. A much smaller producer, Stra Kalkbruk, but the largest lime company in Sweden, also employed exacting quality control in a good, modern laboratory.

PORTLAND CEMENT BY-PRODUCT

In recent years, at least, three large German lime companies, including those at Wulfrath and Dornap, have been making portland cement largely from their waste quicklime fines and from waste mud from their stone-washing plant, or quarry overburden. The quality of the cement is excellent, too, meeting all German standards. Lime companies in no other country do this. Production, of course, is relatively small, consisting of the output from one conventional small to medium-sized rotary kiln. However, one German company is currently adding a second rotary kiln because of the excellent trade acceptance of its product. The manufacturing costs are extremely low, undoubtedly much lower than conventional German cement plants because (1) they use waste materials and (2) they require less fuel because quicklime (rather than limestone) is in the cement flour feed. Details on such a plant are:

Raw Materials

About 70 percent pulverized quicklime of 0 to 1/10 in., plus some miscellaneous lime waste, grit, and core
About 30 percent clay (+ sand)
Silicate modulus 2.75 to 3
Lime saturation 87 - 92 percent

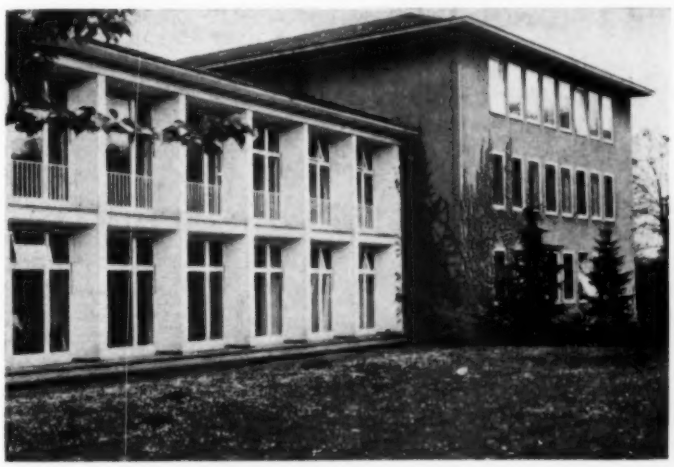
Approximate Operational Data

Fuel consumption (including clay drying) - 1,650,000 B.t.u.'s per ton
Burning temperature - 2,600 deg. F.
Primary air temperature-340 deg. F.
Secondary air temperature - 940 deg. F.
Capacity - 350 tons/day/kiln

Equipment

Rotary Kiln
Make - Krupp
Kiln diameter - 6 ft. 10½ in.
Kiln length - 190 ft.
Electric dust removal - Elex (Swiss)

(Concluded on page 134)



Right, top: A 6½-cu. yd. shovel and a 50-ton side-dump trailer truck in the quarry of the Imperial Chemical Industries, Buxton, England.

Right, bottom: A part of the impressive new office building of Rheinische Kalksteinwerke, Wulfrath, Germany.

Texas Producer Builds for Future

New plant, expanded sales program aimed at larger aglime and roadstone markets

ANOTHER ON THE SPOT report

THE newest and largest of five crushed stone plants built since the founding of the Texas Crushed Stone Company was put into operation a year ago by one of the most progressive producers in the Lone Star state.

This 500-t.p.h. facility, known as the Georgetown plant, from its proximity to that city—about 25 miles north of Austin—was constructed as the result of long-range planning in which many factors were carefully weighed.

This planning took into consideration not only existing markets and their locations, but possible shifts, expansions, and particularly, potential changes in technology and product application that could affect future markets.

By BUREN C. HEROD

Closely related to these were the factors of adequate reserves, and strategic location—to meet projected greater demand in current and future areas of consumption. The next step was the design of a plant that would not only have a high capacity in current basic products, but would incorporate a flexibility to accommodate potential changes in product specifications with the minimum of plant revision.

The new operation embodies all the physical features required to fulfill these goals. Designed by Herb Gaskin Jr., with assistance from the engineering department of Iowa Manufacturing Company, the plant has a rated capacity safely above the demands made on it by present active markets. It also represents nearly a 100 percent increase in overall company capacity.

An excellent location permits shipment by either rail or truck. About one-third of all shipments are made by rail, and may be originated either on the "Katy" at Georgetown, or the "MOP" at Round Rock, a short distance south.

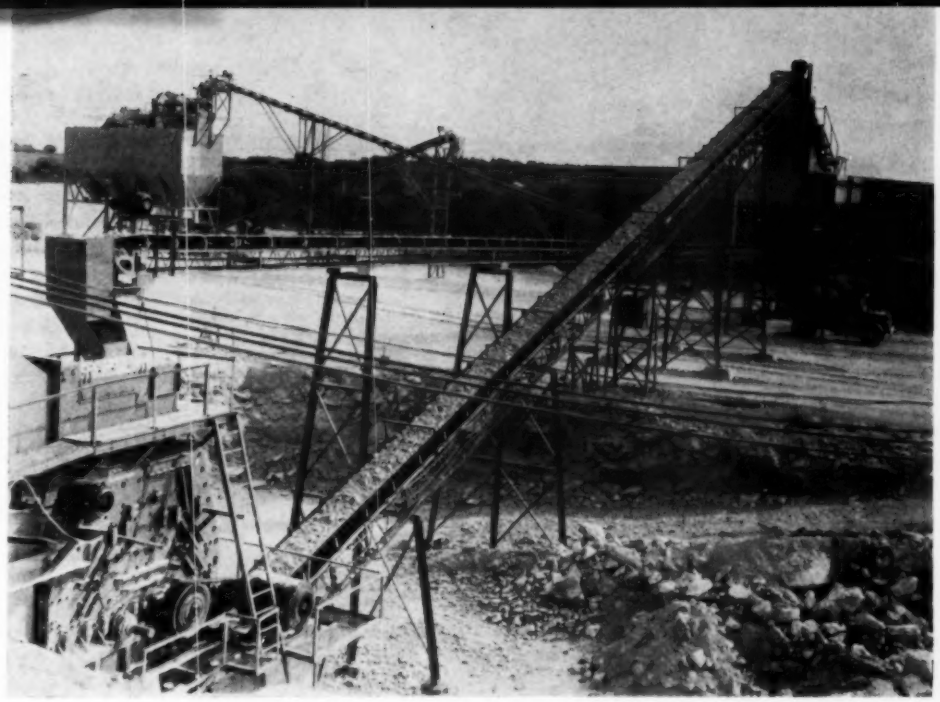
Primary products now in greatest demand include about five stock sizes ranging from 1¾ x 3 down to dust. These include aglime, which is produced at the rate of about 200 cu. yd./day. Most of the remaining output is sold to highway construction. However, the top size stone is marketed as flux stone, and several carloads of minus 10-mesh material is shipped to sintering plants daily.

Although not the largest segment of the firm's business, aglime sales comprise one of the major areas of sales effort. For several years the management of Texas Crushed Stone, headed by E. B. Snead, chairman of the board, has played a leading role in the promotion of aglime application to Texas soils.

Results of this program are impressive. In 1954 only 25,000 tons of aglime were used. By 1958 consumption was up 600 percent to 155,000 tons—obviously, not enough to meet soil requirements, but certainly a substantial gain. It is expected that statistics for 1959 will show an application of about 175,000 tons last year.

In another major area of activity,

A DOWN-THE-HOLE DRILL is used in sinking blastholes on a 10- by 18-ft. pattern. About 8,000 cu. yd. of material is brought down with each shot.



THIS OVERALL VIEW of the 500-t.p.h. Georgetown plant shows the three major processing phases — primary reduction, lower left, primary screening and secondary reduction, right, finish screening and tertiary reduction, upper left.

company officials strongly promote flexible road base material markets. On the sound premise that inferior road design is harmful to the public interest, considerable effort has been expended toward producing top-quality material at a price competitive with less expensive commodities such as oyster shell. Further, the latter requires overspread of additional materials, it is indicated, which apparently would not be the case with crushed stone flexible base.

The tract on which the new plant is located is one which Mr. Snead recognized several years ago as an excellent area for future operations. Situated on the Balcones fault, the 700-acre property includes a part of the exposure of the Edwards limestone formation. Core drilling on only about one-half of the tract has already proven out an estimated 55,000,000 cu. yd. of premium quality stone to a depth of 112 ft. The stone analyzes nearly 99 percent $CaCO_3$, which enhances its aglime and fluxing applications; and the low loss results in the Los Angeles abrasion test of stone from the upper section of the formation have been exceeded by even better performance by material from succeeding lower ledges.

Ground clearing for the plant site and first cut was started in January last year. Owing to the detailed preparation and planning preceding this step (equipment had already been ordered), the construction proceeded rapidly, and in April the plant was placed in operation.

Some of the significant details of operation and equipment stemming from management's progressive ideas and goals of steady and most efficient production, are not readily apparent at Georgetown. For example, crusher drive motors are larger than design specifications, on the premise that this improves crusher efficiency. In another equipment category, standardization has been made on extra-ply belting to minimize loss of production time caused by belt repair.

Most efficient blasting is done by those most familiar with it, and therefore one 4-man powder crew handles this operation at both Georgetown and the Austin plant. Another special assignment is that of ground man in the quarry. It is felt that this employee's salary is more than offset by savings in truck tires, since he keeps the haulage way cleared of sharp fragments.

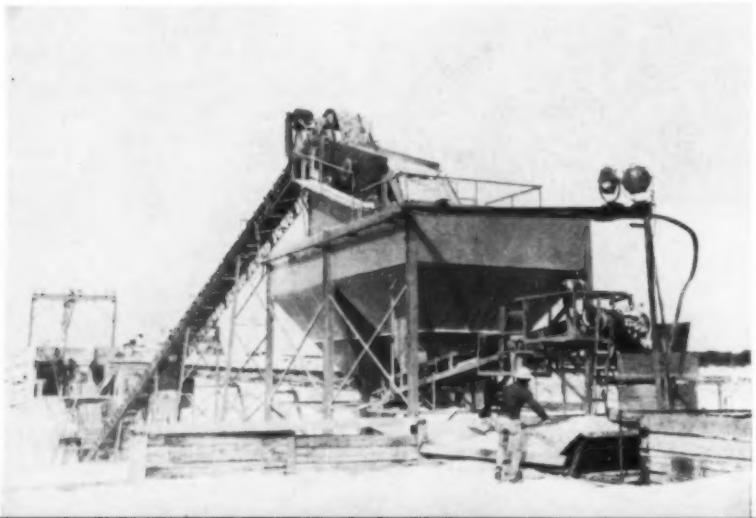
Although the full face of the formation will be worked later on two

THE QUARRY UPPER LEVEL only is worked at present. Subsequently the full face will be taken. The tractor-trailer rig seen here is one of the three 20-ton units used for quarry haulage.

HAULAGE CAPACITY took precedence over mobility or versatility in the decision to use side-dump units. They are assigned only to quarry haulage, and the design of the hopper installation eliminated the need for "spotting."

THE PRIMARY CRUSHER INSTALLATION incorporates an apron feeder, a vibrating grizzly, and a heavy-duty double-impeller impact breaker. At the upper right is the conveyor which returns any desired amount of oversize from the primary screen in equalizing crushing loads.

PRIMARY SCREENING is done with this 6- by 16-ft. double-deck unit. The secondary crusher is being fed via the short conveyor from the bins. It may also be supplied from stockpiles that provide a surge.



levels, only the upper level is currently in production. Drilling is done with a Mayhew 1000 rig equipped with an Ingersoll-Rand down-the-hole unit. One row of 4¾-in. holes is drilled on a 10- by 18-ft. pattern to bring down about 8,000 cu. yd. of material per shot. The charge consists of 80 percent high-pressure gel and Hercomite ammonium nitrate prills, which are detonated with Primacord.

Broken stone is loaded out by a 2½-cu. yd. Bucyrus-Erie 54B shovel. Quarry-plant haulage, handled by a fleet of three White Mustang tractors pulling 20-ton capacity Easton side-dump trailer bodies, is another phase to which company officers gave careful study.

In weighing payload *versus* mobility or versatility, it was decided that production was paramount, and that haulage units would be used only in travel from shovel to crusher. Further, a straight-through pass at the crusher hopper would not require "spotting" of the vehicles for dump position. On this basis, it was decided to use the side-dump units which, with the desired capacity to support design production, were considerably less expensive than equivalent end-dump equipment.

At the primary crusher installation, the trailer bodies are raised by an Easton dumping hook and discharged into the plant feed hopper. An apron feeder transfers the stone to a vibrating grizzly preceding the primary impact breaker. All three units are Cedarapids equipment. The 4350H heavy-duty double-impeller breaker is driven by a pair of 200-hp. motors.

The primary crusher product joins the grizzly throughs on conveyor No. 1. This 42-in. wide unit, 195 ft. o.c., is fitted with Raybestos-Manhattan belting, as are all other conveyors in the operation.

At the primary screening tower, No. 1 conveyor discharges to a 6- by 16-ft. double-deck Hewitt-Robins screen mounted above a set of two 90-ton bins. One of the latter is divided into two compartments. Separation is made on 3-in. opening screencloth on the top deck, and 1⅞-in. cloth on the lower.

Bottom deck throughs drop into one of the bins as flexible base material. The two retained fractions are

chuted into the appropriate compartment of the divided bin from which they may also be loaded into trucks or drawn onto a short belt feeding the secondary crusher.

However, to equalize crushing loads, any amount of the retained fraction from either deck of the primary screen may be transferred *via* flop gates to a 24-in. by 182-ft. horizontal conveyor (No. 2), and returned to the primary crusher.

The secondary crusher, a 4½-ft. Symons standard cone driven by a 150-hp. motor, delivers a product with top size of about 2½ in., but averaging 1¾ in. A revision to the secondary crushing phase as originally installed involves a ramp and hopper with which the secondary crusher can be fed from stockpiles. The latter provide a surge, and permit a more constant feed, as well as continuous production independent of the quarry and primary reduction phases.

Conveyor No. 3, 30 in. wide on 195-ft. centers, transports the secondary crusher product to the secondary screening tower. Here the material is delivered to the first of two horizontal Cedarapids screens mounted in series above a set of four bins.

The split top deck of the first screen has 17/32- and ¾-in. openings. Middle deck screencloth has 9/32-in. openings, and the bottom deck 3/32- by ½-in. cross slots. Throughs from the latter are dropped into the aglime bin, and the overs are chuted into a bin of minus 5/16-in. hot mix aggregate.

Retained fractions from both the upper and middle decks are fed to the second screen. A double-deck unit, this screen has a split top deck with ¾- and 1-in. openings, and 9/16-in. opening screencloth on the bottom deck. Finished products retained on, and passing, the bottom deck are respectively chuted into bins of minus 1-in. and minus ⅝-in. hot mix aggregate. The top deck fraction is chuted to the tertiary crusher, a 4-ft. short head, and the resulting products are returned on a 24-in. by 100-ft. conveyor to the secondary plant feed belt.

A spur track runs under all of these 75-ton bins to accommodate direct rail loading. Sufficient grade was provided in the tail track to allow cars to roll alone. They may also be spotted by the Euclid stockpiling trucks, and front-end loaders, as well as by locomotive. Most of the aglime tonnage sold is shipped by rail transportation.

Truck haulage, customer or contract, may also be direct-loaded from the various bins, or from the stockpiles by a Lorain Moto-Loader. Both trucks and rail shipments are weighed at the same scale house over a 50-ft. truck platform and the 60-ft. rail platform of a Toledo scale installation.

Plant operations are handled by a 16-man production crew and two maintenance men. W. H. "Jack" Campbell, who has been associated with Mr. Snead for nearly 27 years, is general superintendent of both the Georgetown and Austin facilities. Co-ordination of these operations is aided by the firm's G-E base and mobile radio equipment.

Although there are not a great number of years remaining to the Austin operation, the advantages of location, reserves, and operating efficiency inherent in the new Georgetown plant provide more than enough foundation for the company's expanding sales programs. They will, in fact, permit a considerable broadening of sales horizons.

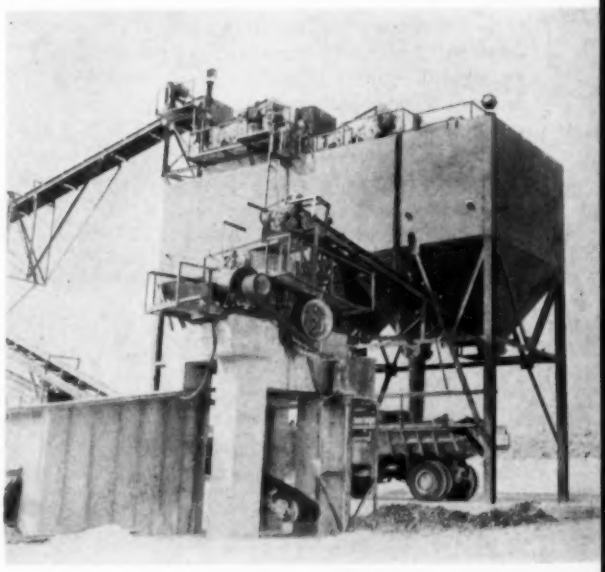
In the meantime, the two plants together are providing nearly 800 t.p.h. of capacity to serve the Austin and contiguous areas. In addition, the company also operates a granite jetty stone plant at Burnet.

In addition to E. B. Snead, chairman, officers of T.C.S. include E. deS. Snead, president; and W. H. "Jack" Campbell, vice-president.

HAROLD R. FLINT represented the Lone Star Cement Company at the President's Conference on Occupational Safety, held in Washington, D. C., on March 1 to 3. More than 3,000 leaders of American industry, labor, agriculture, government agencies, and various other groups attended the conference.

SUPERVISION. W. H. "Jack" Campbell is general superintendent of both the Georgetown and the Austin plants. The former has a 16-man production crew.

Right:
SECONDARY SCREENING is handled by the two horizontal units mounted in series above the bins. In the foreground is the tertiary crusher. Aglime and other materials may be direct-loaded from these bins into rail cars or trucks.



European Lime Manufacture

(*Concluded from page* 129)

Crude Flour and Cement Mill
- Make - Krupp
- Mill diameter - 9 ft. 2½ in.
- Mill length - 23 ft.
- Motor voltage - 10,000 volts
- Electric power - 700 kw.

Grate Cooler
- Make - Fuller
- Dimensions - 31 ft. x 6 ft. 3½ in.

In addition, various grades of artificial hydraulic limes, some approaching natural cement in their degree of hydraulicity, are made by blending materials, in the manner of portland cement, by German companies. With such limes, blast-furnace slag is admixed with waste lime alone or with clay. Other European lime companies make natural hydraulic limes from limestone, often without admixtures.

DOLOMITIC REFRACTORIES

Two lime companies visited have developed a large, profitable refractory business, using their own dolomite as the main raw material. These companies are Stra Kalkbruk, Sala, Sweden, and Rheinische Kalksteinwerke, Wulfrath, Germany.

Swedish Refractory—Using a patented Italian process, Stra makes large rammed dolomitic refractory linings, semi-circular in shape, that are molded to exact size specifications for a given furnace. These large refractory sections can weigh over a ton each. The product is made entirely from an especially hard burned dolomite of about 10 mesh size, admixed with some tar, and then fed into molds and compacted with pneumatic hand compactors. The final product is coated with tar and is ready for shipment. This refractory is sold to the Scandinavian steel and chemical industries, and is reported to be replacing conventional refractory brick because it costs less to reline the furnaces, and lasts longer, with less maintenance. There is prospective use for this product in cement and lime rotary kilns, as well.

German Refractory—This is made by the same Wulfrath company as an adjunct to the dead-burned dolomite production at its Hohenlimburg plant. Unlike the Swedish product, it is made without tar or any type of binder. Dead-burned dolomite is pressed into conventional sized brick and block in hydraulic presses, and then the product is sintered at high temperatures in special tunnel kilns. The process was developed in this company's research department, and is in a patent-applied-for status. The cold compressive strength of the brick is 5,700-8,500 lbs./sq. in., and the refractory softening temperature is 3,100-3,200 deg. F. Density of the brick is 2.7 to 2.8 kg./cu. m.

A large sectional, semi-circular refractory made from hard-burnt dolomite by Stra Kalkbruk, Sala, Sweden.

This refractory has enjoyed wide sale to the German steel industry, as well as to German and foreign lime and cement plants. One United States lime plant has even imported the product. It costs about $80 per long ton, F.A.S. Hamburg. It is claimed that the brick lasts twice as long and provides better insulation than conventional refractory brick.

Recapitulating, the Wulfrath company is an excellent example of how an enormous industrial enterprise can be built on one material—*limestone*. The following products are made by this company (and these are largely duplicated by the Dornap company):

High-calcium and dolomitic limestone (many gradations for)
1. Road stone
2. Rip rap and railroad ballast
3. Concrete aggregate
4. Asphalt filler
5. Rock dust
6. Flux stone
7. Agstone
8. Miscellaneous uses

High-calcium quicklime
1. Lump
2. Pebble
3. Ground to pulverized— for all chemical uses, possibly excepting glass; structural purposes; ground burnt for agriculture (liming)

High-calcium hydrate
1. Chemical use (refined hydrate)
2. Building limes (mason's hydrate, etc.)
3. Agricultural liming (crude hydrate)

Dead-burned dolomite
1. Refractory
2. Captive use for dolomitic brick

Hydraulic limes
1. Weakly hydraulic hydrate
2. Moderately hydraulic hydrate
3. Highly hydraulic hydrate

Portland cement

Dolomitic refractory brick

Let's Look at Lime

(*Continued from page* 121)

to soap. Even an additional 10 cents per ton would hardly deter a farmer from buying, and this small price increase would make possible a much greater promotional effort than at present.

The first goal in advertising should be a cartoon-type movie explaining the complexities of the performance of lime to a farmer and at the same time selling him the benefits to be derived from liming. Copies should be provided free of charge to any in-

terested group, through conventional channels such as the Farm Film Foundation.

Joint Advertising Did you ever notice the joint advertising of products—like peaches and cream or pancakes and syrup? The interdependence of lime and certified alfalfa seed, lime and ladino clover, or lime and nitrogen fertilizers offers unlimited opportunities for worthwhile co-operation with other groups. Lime, like milk, has no competitors, and it provides tie-in opportunities with many commodities used by farmers.

Spreading Service The lime industry is behind both seed and fertilizer groups in supplying service to farmers, and at a time when farmers are demanding more of it. Progress has been made in the last five years. There are a few lime agronomists in New England, but not nearly enough for the job.

With an expanded program of this sort, plus the efforts now being made, lime sales are likely to increase. Extension service personnel would feel that they are not promoting lime alone. Farmers would have more alfalfa and better growth of other forage crops. Above all, the limestone industry would gain additional stature in making a sincere effort to help farmers; and its help would be appreciated by members of related industries, who would be most thankful for the necessary support to get more lime on the farms, where it is needed.

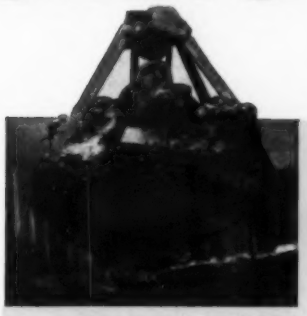
"Biggest" Walking Dragline Ordered by Ideal Cement Co.

Ideal Cement Company recently purchased what is reported as the largest track-mounted dragline built in the United States for stripping use in its limestone quarries near its Boettcher, Colo., plant.

The $500,000 crane, purchased from the Harnischfeger Corporation, weighs about 300 tons, not including the bucket. It is operated by a 600-hp. motor powered by a special line from the cement plant. Cab and tracks are 44 ft. long and 22½ ft. wide; the 9½-cu. yd. bucket can scoop up 14 tons of material.

OWEN BUCKETS

THE GIANT OF THEM ALL



The following five combined features make OWEN the big giant performer . . . for any type of clamshell work . . . for any model or make of crane.

1. Block and Tackle Type Reeving
2. One-Piece Head Construction
3. Riveted Bowl Assembly
4. Single Main Shaft
5. Recessed Lips

Added to these construction features are more than fifty years experience in the manufacturing of clamshells . . . and nothing else! For any job that requires a clamshell, there is an Owen to fill the bill . . . backed by proven construction design and over one-half century of experience.

Put the Giant on your crane — OWEN — and know the work will be done faster, better and more economically.

Write today for any specific or additional information

The OWEN BUCKET Co.

BREAKWATER AVENUE, CLEVELAND 2, OHIO

BRANCHES: New York • Philadelphia • Chicago
Berkeley, Calif. • Fort Lauderdale, Fla.

Enter 135 on card, page 233

Sour Facts About Eastern Agriculture

By JAMES H. EAKIN
Extension Agronomist
Pennsylvania State University

James H. Eakin, professor of agronomy extension and chairman of the plant sciences division for program development, Agricultural Extension Service, heads the soil testing service at Pennsylvania State University.

Mr. Eakin received his B.S. degree in 1946 and his M.S. degree two years later at Ohio State Univ. After serving as instructor in soil technology and head of the soil testing laboratory from 1947 to 1949 at Ohio State, he was named to the faculty at Pennsylvania State.

While at Ohio State, Mr. Eakin conducted research on muck soil management in Ohio. He has also made studies on birdsfoot trefoil in Pennsylvania and soil testing methods.

ANOTHER P&D EXCLUSIVE

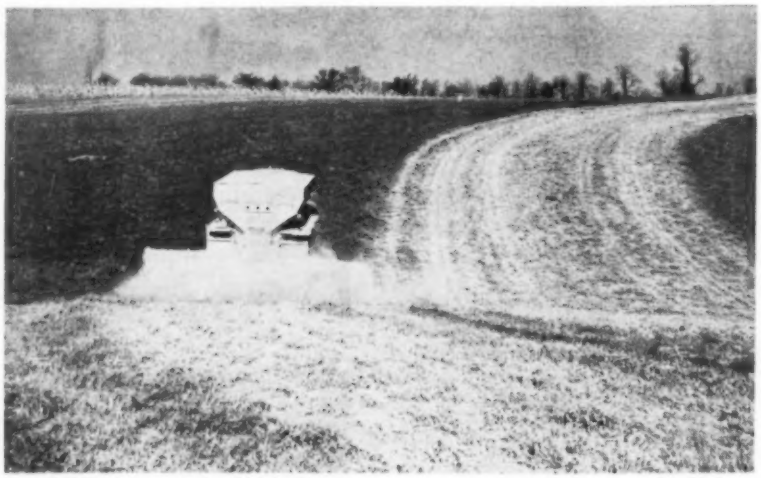
THE writer recently returned from a meeting of agronomists from the northeastern and middle Atlantic states. Although he has associated with these men for a good many years, a genuine concern over our sour soil condition was noticed for the first time at this meeting. Farmers are using less lime each year, and our soils are becoming more acid.

Data on limestone use will show that from 1935 to about 1950 the use of liming materials increased tremendously, but since the early 1950's the use of lime has dropped steadily and precipitously. Some of the larger states are declining in lime use by as much as 100,000 tons per year. One might say this is because we are losing farms and farmers, but the data disputes this contention. We are using less lime on fewer acres.

Perhaps a peculiar fact that bears thinking about should be mentioned here. *Our lime tonnage is dropping, but fertilizer consumption has risen in a spectacular manner.* In the Middle Atlantic states we used 3.95 lb. per acre of elemental nitrogen in 1939. In 1957 we used 14.30 lb. of nitrogen per acre. If we had 1959 statistics, they would show an even greater percentage increase. This doesn't make sense, since we were all taught years ago that fertilizer isn't much good unless lime gets there first. Most nitrogen carriers are acid-forming, and the use of nitrogen is increasing at a fantastic rate.

One man said recently that in 1958 it would have taken in his state almost 100,000 tons of limestone just to neutralize the acids formed by nitrogen fertilizers. The supply of nitrogen in 1959-60 will be about 11 percent greater than any previous record. We seem to be caught in a squeeze play—lime use going down while fertilizer use goes up. This is not a very sound approach to an efficient agriculture.

We like to think that we are modern; we indulge in interplanetary talk, fly in 4 hours from coast to coast, wear nylon shirts, and eat TV dinners. However, we're modern



Soil acidity is the most serious soil management problem we face in eastern United States. Spreader trucks like this one help to maintain an efficient agriculture.

in only some things. In our hurry-up world we've evidently forgotten our oldest and most important lesson in agriculture.

We have forgotten what our fathers and grandfathers knew and religiously practiced—we've forgotten about lime. Improved crop varieties, better cultural practices, and more fertilizer enable plants to extract more lime from the soil. Our leaching losses still go on; we lose about 575 lb. of calcium carbonate equivalent per acre each year. In large areas east of the Mississippi River a lack of lime blocks the response of fertilizer on fully 60 percent of the crop and pasture acres.

Whose Fault Is It?

It's nice to have a whipping boy, but this doesn't solve problems. Ask any farmer; he knows that lime is important. How, then, can he be influenced to use what he knows he needs?

Let's sell lime on what lime alone will do for the farmer. Why not? That's the way our fertilizer industry sells its product—and does a fine job. We tell a farmer that before he applies fertilizer he should make sure to correct his lime needs. Then we spend the next two hours extolling the virtues of *fertilizer*, to the point where our man has forgotten all about our beginning statement on lime. How much credit does lime get in the thousands of fertilizer demonstrations put on each year? We keep the pH up around 6.5 to 7.0, and then vary the amount of fertilizer. The lime is taken for granted.

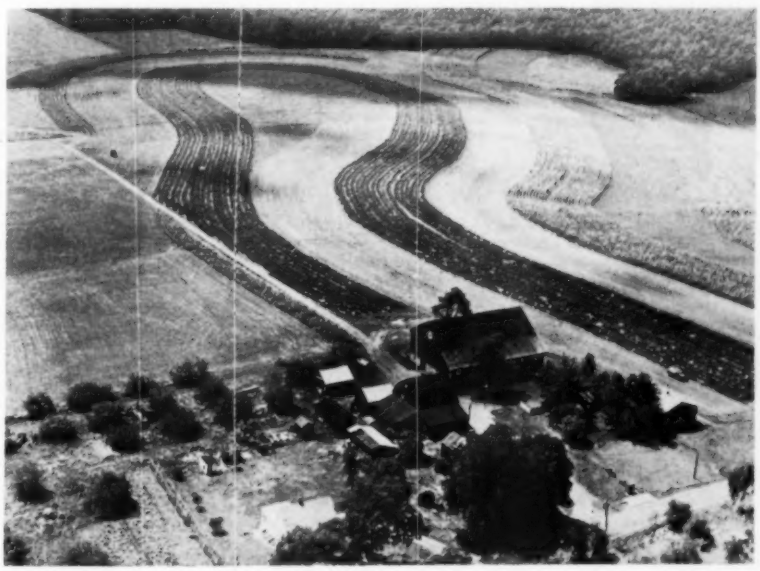
How about running this thing in reverse for a change? Keep the fertilizer constant and then *vary the amount of lime applied*. This procedure will generally show that full liming pays off a lot better than half-liming. It will also show the usual thing—that lime and fertilizer make a necessary team.

There is no better way to start a group of farmers talking about lime than to show them what the various crops will do at pH 7.0, and then ask them what they will do at pH 5.0. Of course, we fertilized according to soil test. Here's the switch. We're talking about lime, not fertilizer.

	Yield/Acre pH 7.0	Yield/Acre pH 5.0
Alfalfa	8,000 lb.	None
Red clover	6,000 lb.	1,200 lb.
Timothy	6,000 lb.	2,400 lb.
Corn	100 bu.	67 bu.
Wheat	40 bu.	30 bu.
Oats	60 bu.	54 bu.
Barley	60 bu.	14 bu.

We must have data like this if we expect ever to convince a farmer that full liming is sound and profitable. The above data is local; it does not pertain to all states. However, the figures should be available even if only on a crop percentage increase basis. Apply your own costs and use it for a rotation. Let's say it costs $20 per acre to bring the pH up from 5.0 to 7.0. In a four-year rotation this will be $5 per year. On the second four-year rotation it would cost only as

This was once a good farm, but little lime was used. The soil became sour and poor. Clover and alfalfa failed, and sods were thin. With little hay, there was little manure. Each year the soil became poorer, lower in organic matter, and more subject to erosion. No cover crops were used, and gullies were not controlled. Erosion finished the job, but soil acidity was the fundamental trouble.



A magnificent view of a prosperous family farm. This is a typical Pennsylvania Dutch farm. (Note the hex signs.) One lesson the Pennsylvania Dutch have learned well is that lime doesn't cost—it pays.

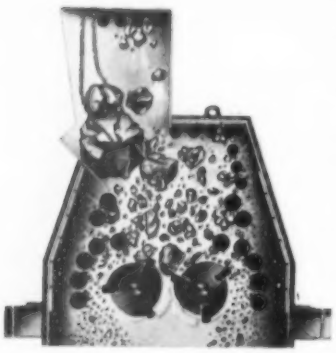
for lowest cost per ton in limestone—
YOU CAN'T BEAT CEDARAPIDS for
Production Balanced Components

"Crushers and screens are well balanced for efficiency—maintenance is very low," says the owner of the plant at the right. That's a typical statement by limestone producers about the balanced production of Cedarapids-engineered Stationary Plants.

Cedarapids maintains a special engineering department to "tailor" your plant to your particular job conditions. Cedarapids engineers know rock, from limestone to granite or basalt. They know the equipment that will handle *your* rock most profitably. They have a wide choice of components in the complete Cedarapids line, and they recommend not only the proper type of unit for your quarry conditions, but also the size that matches every other component in your plant for balanced production. They engineer extra tons of capacity into your plant and show you how to reduce maintenance and operating costs. Call in a Cedarapids engineer and be sure of getting lowest cost per ton.

Clark Limestone Company's 100% Cedarapids Plant includes a 3645 Double Impeller Impact Breaker with Vibrating Grizzly and 36″ x 14′ Feeder, a 4033 Hammermill, three 48″ x 12′ Horizontal Vibrating Screens, a Stabilized Base Mixer, and the necessary conveyors and bins selected from . . .

A COMPLETE LINE OF QUALITY-BUILT COMPONENTS
to serve the limestone industry

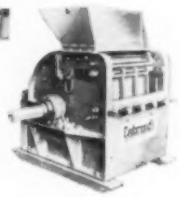


DOUBLE IMPELLER IMPACT BREAKERS

In the drawing at left, note the counter-rotating impellers, an exclusive Cedarapids feature. With this type of action, *both* impellers do equal work. There is less scuffing and grinding of rock, and less unequal wear on the hammers. *Counter*-rotation eliminates the shearing action of two impellers operating in the same direction and the resultant strain on shafts and bearings. The opposite rotation of Cedarapids impellers, plus the high angle of feed, imparts a true impact action, striking the rock squarely and hurling it upward and outward to break rock against rock in the entire breaking chamber. High capacity with minimum wear and maintenance is the result.

HEAVY-DUTY FEEDERS

Especially designed for smooth feeding of heavy, large-sized material. Rugged construction, with 9 shafts beneath the heavy cast flights, withstands shock of dumping heavy material into the feeder.



HAMMERMILLS

Exclusive Cedarapids Hammermill features produce a much better quality of product, and size for size, produce more tons per hour than other similar types of equipment. Four sizes meet your needs.

HORIZONTAL VIBRATING SCREENS

Fast, snappy action, with no soft cushioning effect. Horizontal cloth openings permit more of the correct size of material to go through, yielding 30% greater capacity than same-size inclined screens.

Cedarapids engineered for lowest cost per ton!

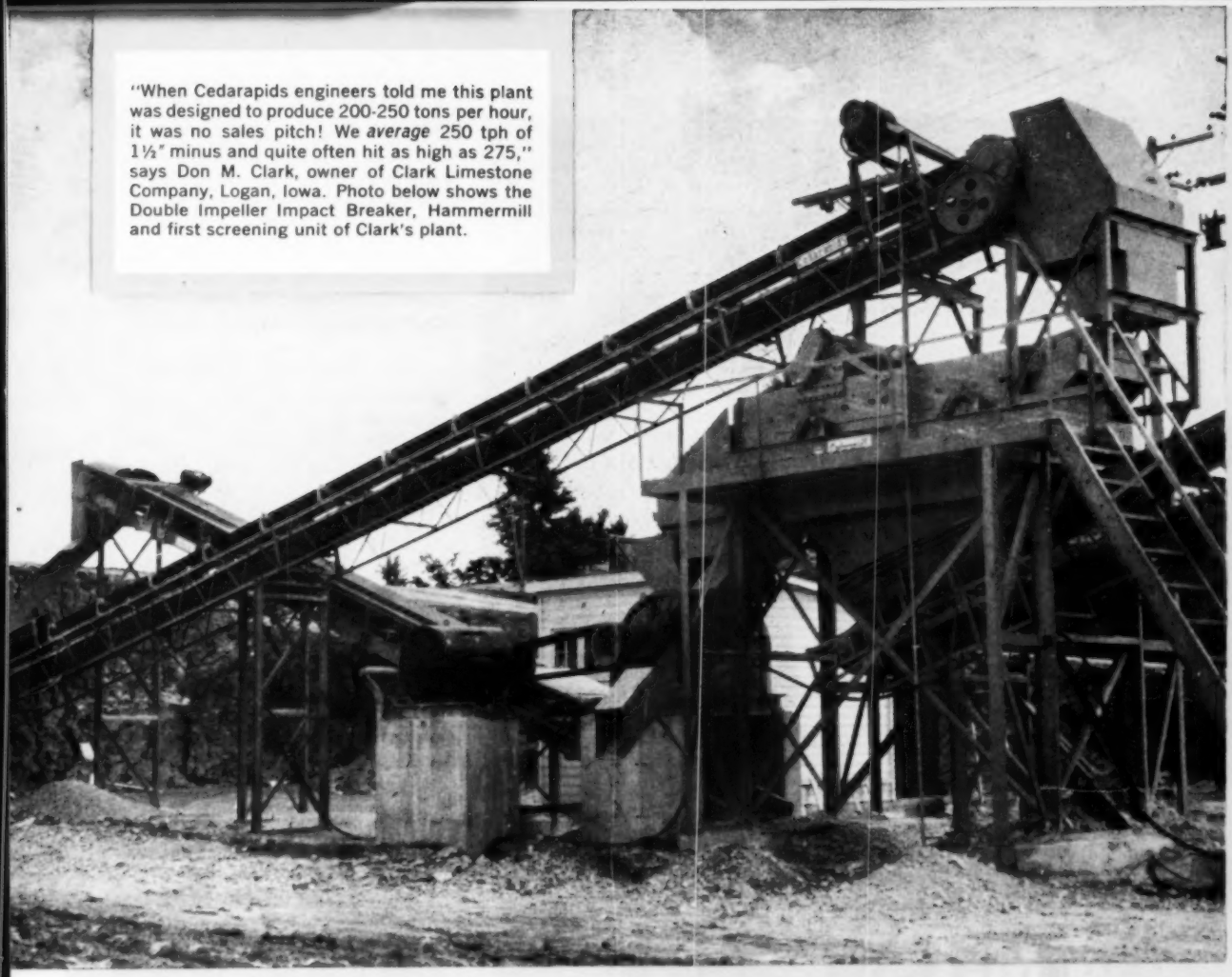
Cedarapids Built by IOWA

S760-N

IOWA MANUFACTURING COMPANY
Cedar Rapids, Iowa

Enter 138 on card, page 233

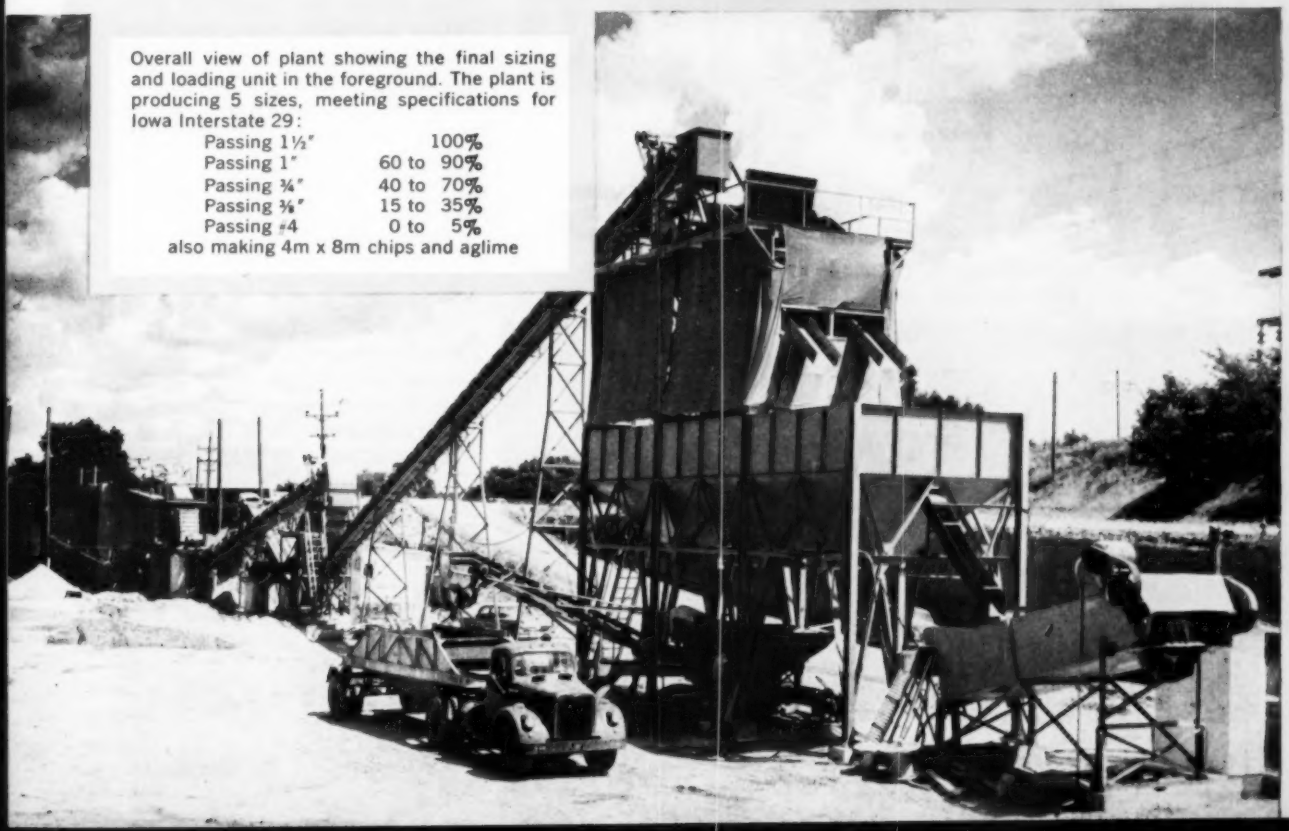
"When Cedarapids engineers told me this plant was designed to produce 200-250 tons per hour, it was no sales pitch! We *average* 250 tph of 1½" minus and quite often hit as high as 275," says Don M. Clark, owner of Clark Limestone Company, Logan, Iowa. Photo below shows the Double Impeller Impact Breaker, Hammermill and first screening unit of Clark's plant.



Overall view of plant showing the final sizing and loading unit in the foreground. The plant is producing 5 sizes, meeting specifications for Iowa Interstate 29:

Passing 1½"	100%
Passing 1"	60 to 90%
Passing ¾"	40 to 70%
Passing ⅜"	15 to 35%
Passing #4	0 to 5%

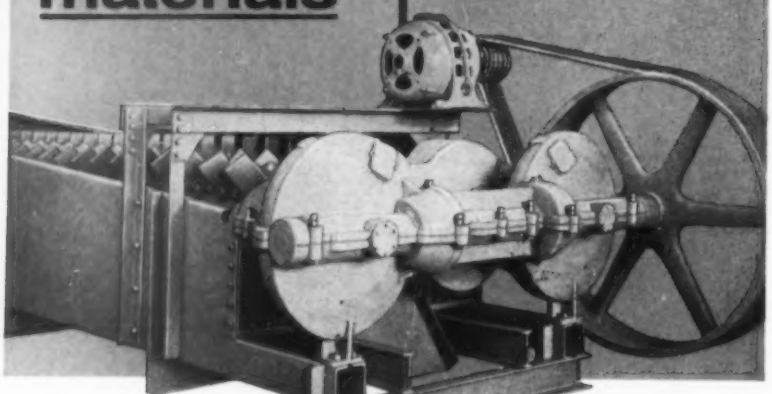
also making 4m x 8m chips and aglime



High Capacities of clean materials

Developed from the world's first all-steel log washers built by McLanahan & Stone in 1894, these machines produce high tonnages of exceptionally clean materials—removing tough clay, soft rock and refuse with unequalled speed and economy • Available in Washmaster and Mudmaster styles.

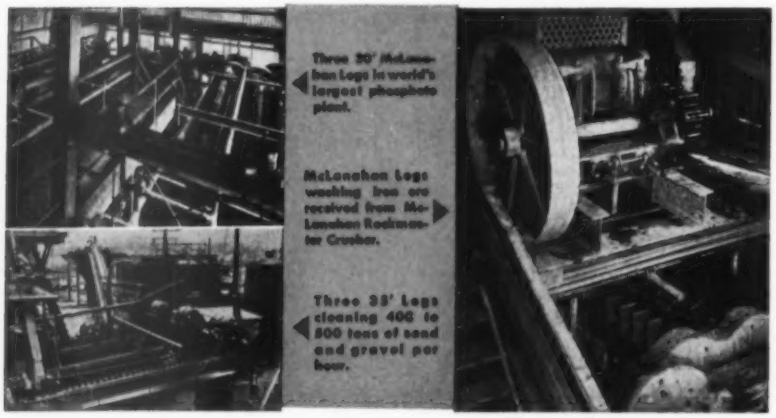
Write for Bulletins WLO-1155 and MM-90.



McLANAHAN SINCE 1835

LOG WASHERS

McLANAHAN & STONE CORPORATION
253 Wall Street, Hollidaysburg, Pennsylvania


Three 30' McLanahan Logs in world's largest phosphate plant.
McLanahan Logs washing iron ore received from McLanahan Rockmaster Crusher.
Three 35' Logs cleaning 400 to 500 tons of sand and gravel per hour.

Enter 140 on card, page 233

much as one ton of lime for the next four years, or a maintenance application. Use local market prices for corn, hay, wheat, oats, etc. Apply these market prices to the crop yield increase due to lime. You'll come out with some handsome profits and a convincing story that lime doesn't cost; it *pays!*

Lime Promotion Literature

Some of this literature is good; but most of it is bad. We ran a readability test recently on certain lime promotion literature, and most of it graded "difficult to read." To motivate the average farmer to buy anything, your story must be easy to understand. We need the help of skilled editors to write convincing lime literature; it's their business, and they should know how to do it. I picked up a lime folder recently which told about hydrogen ions and base exchange capacities in terms of milliequivalents. This case is admittedly worse than usual, but there are all gradients of difficult-to-read lime literature.

Selling Lime to Farmers

I passed out a questionnaire to farmers recently to determine, among other things, how long had it been since a lime salesman had stopped to see them. The average time stated was about five years. Many had never seen a lime salesman. Lime won't sell itself; it's poor business to think the government will sell it. The universities have tried, but lime sales are still dropping. The old story that there is no money in agricultural lime definitely should receive sympathy; but there are many making a good living selling it. If you take the attitude that profit margins are too low, lime won't be sold.

Positive Approaches Are Needed

The Pennsylvania Stone Producers Association met recently and assessed themselves a few pennies per ton of lime sold in Pennsylvania. They will use this money to start a campaign of lime promotion. Here are a few parts of their 12-point program.

1. To set up a "lime demonstration farm" with the help of Pennsylvania State University. All fields will be limed according to soil analysis. A check must be made, or no lime strip will go across the field.

The association will foot the bill for lime; the farmer pays all the other bills. This demonstration farm will be used (a) as a training ground for limestone producers and salesmen; (b) as a place for meetings of the local county agent with his farmers; (c) as a place to carry on research by the state university. Here we have a fountainhead for much good sermon material with which to convince others that lime is the most basic and important part of a successful farming program.

2. To put together a salesman's manual on agricultural lime. In this manual will be included the how and why of lime sales.

3. To assemble a colored slide set on the use of lime. The slide story will be given to all salesmen, as well as to county agricultural agents.

4. To run a study on what is happening to lime consumption by types of farms under the ASC program. They want to know who is buying lime and who is not; also what kind of farmers they are.

5. Pennsylvania Stone Producers Assn. has asked Pennsylvania State University to devote its yearly Agronomy Guide to lime use. The university has looked upon this request with favor.

6. To revise lime sales literature to make it more readable and convincing.

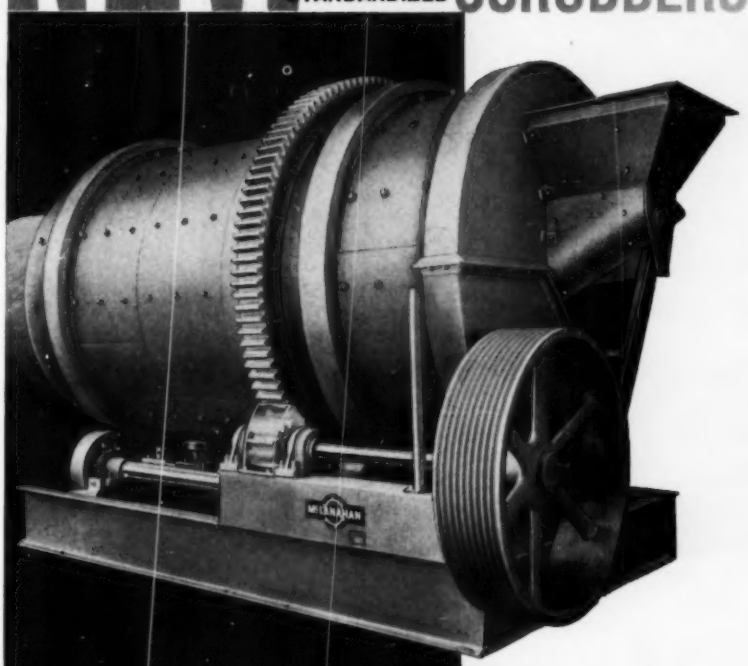
7. To run a lime sales school for members, at least two days, and perhaps longer.

8. One large fertilizer company suggested that the Pennsylvania Stone Producers have a "Standard Seal of Approval" made. They will ask fertilizer companies to use it on all their sales literature and magazine advertisements. When a company shows experimental data concerning the value of its fertilizer, the seal of approval is to read, "These statements true only when lime needs are met."

A Job To Be Done

It is good to see an organization like the Pennsylvania Stone Producers set out in an enthusiastic manner to push their product. This seems to show that there is still plenty of kick in the old lime story. It's a job that needs to be done, and from a farm viewpoint, *it has to be done.*

NEW HIGH-CAPACITY STANDARDIZED SCRUBBERS



McLANAHAN SINCE 1835

TYPE HD HEAVY DUTY

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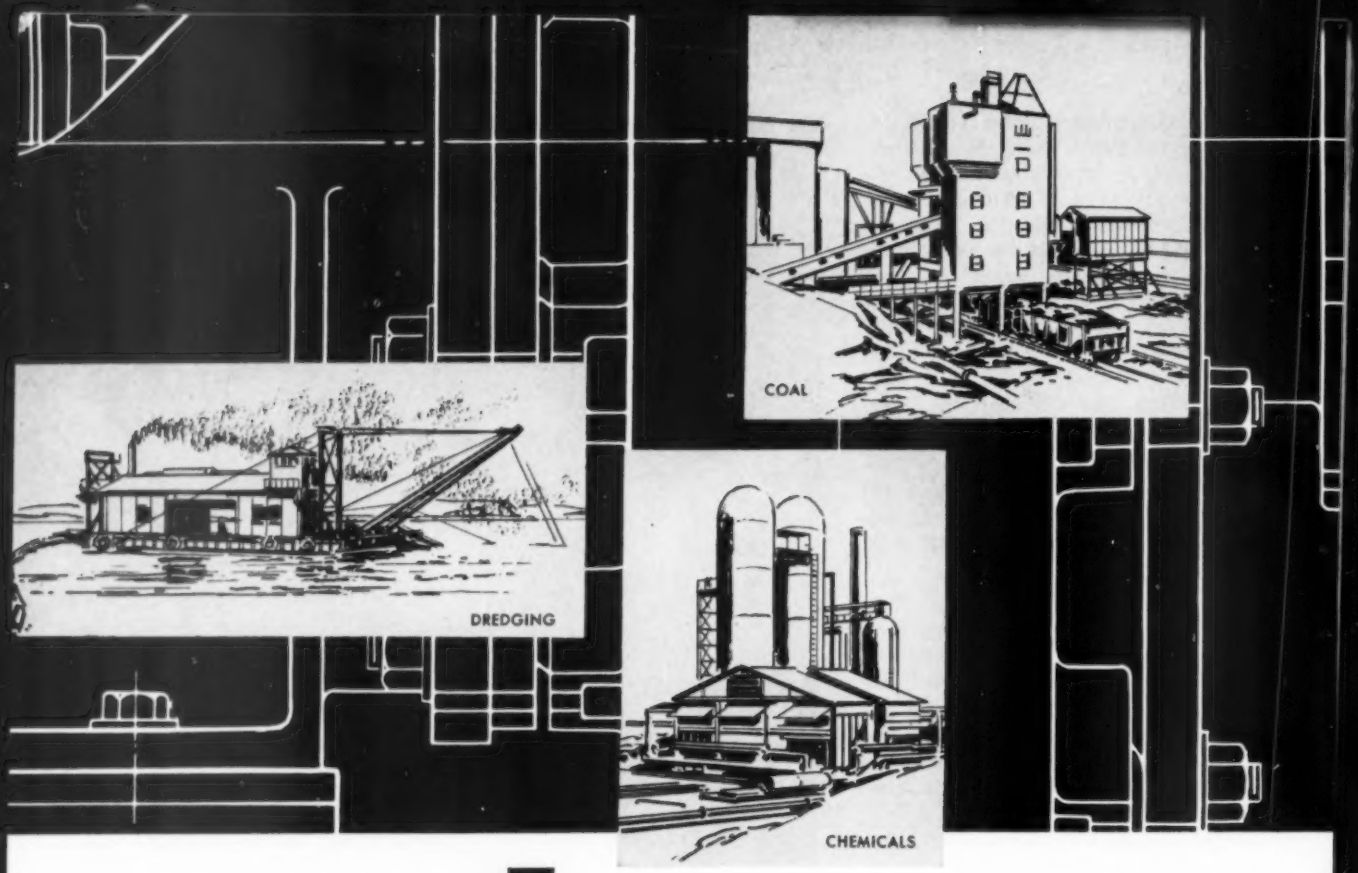

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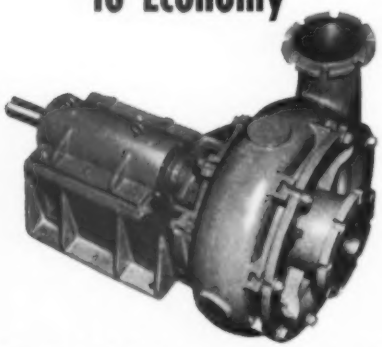

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Random Thoughts on Limestone

By SAMUEL R. ALDRICH
Professor of Soils Extension
University of Illinois

S. R. Aldrich, extension specialist in soils, has been a member of the University of Illinois extension staff since 1957. He received his B.S. degree in farm crops from Michigan State University in 1938 and his Ph.D. from Ohio State University in 1942.

At Ohio State Mr. Aldrich was engaged in research work for the university and for the U.S. Department of Agriculture; he was also assistant secretary-treasurer of the Ohio Seed Improvement Association. In 1942 he served on the staff of Cornell University, where he was responsible for extension and resident teaching.

His professional affiliations include membership in the American Society of Agronomy, the Soil Science Society of America, and The American Association for the Advancement of Science.

THIS article is for limestone producers and distributors, not for farmers. It is intended to clear up some points and to stir up others. I am sure that not everyone in the limestone industry will agree with all of the statements made here. I hope they stir up some lively debates.

Selling Agstone on Merit First, I would like to see agricultural limestone sold on merit. A premium product should command a premium price; a mediocre product should be priced accordingly. What is the present situation? I am not familiar with practices in all states, but generally the Agricultural Conservation Program establishes the specification for "standard" limestone, and this becomes the standard for the industry. Moderate penalties are imposed for sub-standard products, but no credit is given for limestone that considerably exceeds standard in neutralizing power or in fineness or in both characteristics.

I submit that the whole program of agricultural limestone evaluation encourages mediocrity. I believe that it is psychologically wrong continually to refer to limestone as a product that is so cheap that precision is unnecessary in labeling, pricing, testing, and spreading.

Leaching of Limestone Second, I would like to clear up the matter of leaching of limestone. Our estimates of leaching losses were based on a few lysimeter studies. I feel that for several reasons these led to erroneous conclusions about leaching. (A lysimeter is composed of a container with a drainage tube in its bottom and a vessel to collect the drainage water.) Most of the lysimeter studies on limestone leaching measured the calcium and magnesium lost from soils that were near neutral in the subsoil. Furthermore, the calcium and magnesium had to move only a matter of inches in order to be measured in the drainage water. *Therefore, the losses indicated by these studies are unrealistic for losses from limestone applied to the plow layer of acid soils.*

Some calcium will move out in the form of neutral salts, but most of the calcium that dissolves from limestone reacts with soil acids and remains on the base exchange sites of the clay and organic matter. Several studies show that the neutralizing effect of limestone may be expected to move downward at the rate of less than 1 in. per year. The texture of the soil, the amount of rainfall, and the rate of liming will influence this rate.

A laboratory experiment at the New Jersey Experiment Station showed that about 1 percent of the calcium from 100-mesh limestone leached through a 5-in. column of a silt loam soil when 44 in. of water were leached through. This is the equivalent of 3 to 4 years of net water movement through the soil profile in most of the major limestone-using areas. Note that the soil was a silt loam, and the soil depth was only 5 in., far less than is involved under field conditions.

Standard Fine, Coarse Limestone Third, I would like to clear up the confusion of many persons about fine, standard, and coarse limestone. I wonder how many limestone distributors know that farmers and those who advise them often refer to limestones differing only in fineness as though they were completely different chemical compounds? They frequently ask, for example, whether a fine and a coarse limestone will have the same immediate effect if equal amounts of 60- to 100-mesh material are applied? *(Turn page.)*

← Enter 142 on card, page 233

An example of uneven lime spreading due to an inefficient spreading unit.

Screen Data Needed Fourth, I would like to see the limestone industry take the initiative in describing its product, so that farmers and those who advise farmers can evaluate it on 1-, 4-, and 10-year bases. This innovation would not simplify liming recommendations, but it would make them more precise.

To implement this suggestion, it would be necessary for the industry to show the screen score on limestone offered for sale. At least three figures would be desirable, perhaps over 8- or 10-mesh, through 30, and through 60. Those who have conducted research on the effectiveness of different particle sizes would need to estimate the percentages of the three size fractions that would react in 1 year, 4 years, and 10 years. With this information, the comparative value of limestones can readily be calculated for 1-, 4-, and 10-year bases, as in the accompanying table. The suggested values in this table are tentative and need to be confirmed by further study. They are used to illustrate a point.

Approximate Relative Values (Tentative) of Limestone of Varying Particle Sizes Evaluated 1, 4, and 10 years after Application*

Size Fraction	Time after Application 1 yr.	4 yr.	10 yr.
Through 60-mesh	100	100	100
30- to 60-mesh	50	100	100
20- to 30-mesh	20	60	100
8- to 20-mesh	10	30	60
Over 8-mesh	...	15	30

*Based on a study of several investigations, rather than any single investigation.

I feel that this approach has advantages because I believe that farmers should have the option to buy the product that best fits their specific situations. Consider, for example, neighboring farmers who have fields at pH 5.0. One plans to seed alfalfa or clover in 1960, the other in 1963 or 1964. The farmer who plans to seed the legume this year places a premium on the 60-mesh and finer material. For the man who won't seed until 1963 or 1964, the 30- to 60-mesh fraction may be as valuable as the through 60-mesh fraction. The farmer who is not short on capital may desire to make a long term capital investment, and for him the 20- to 30-mesh fraction should receive full credit because it will react over a 10-year period.

I have heard the comment that farmers, county agricultural agents, and local dealers will not go through the complicated calculations involved in this approach. It is true—they won't, except in a few special cases.

Why shouldn't the limestone producer do it? I have presented this approach in comparing limestones for producers, county agents, and local dealers in Illinois. It is the responsibility of industry to decide what to do with it in merchandising limestone; but it will become a part of our extension education plan.

Setting up some basis such as is suggested here would go far in explaining the great differences in recommended rates of liming and in price per ton from one state to another. When I left the Northeast a few years ago, I recall having a limestone producer tell me that he hoped I could talk the Midwestern people out of selling roadstone for agstone. When I arrived in Illinois, the limestone producers wanted to know why limestone in the Northeast cost twice as much as in the Midwest. Modern farmers learn about liming practices from other regions through travel and through reading national farm magazines. Some of the things they read about rates of liming are rather confusing unless they understand differences in fineness and in price.

Agronomic Problems Fifth, I would like to see more agreement on reasons for applying lime, and also on the most economical pH level. These are mainly agronomic problems. In general, the differences among states are not great but they are still sufficient to cause some confusion. With respect to why we add lime, the principal points of contention are these: (1) whether or not calcium and magnesium are frequently limiting as plant nutrients even in soils as acid as pH 4.6 to 5.0; and (2) whether the main need for liming is to raise pH and thus reduce toxic levels of manganese, and to a much smaller extent those of iron and aluminum.

I believe that agronomists, at least in the northern half of the United States, are essentially in agreement that the recommended long-term goal for liming moderately to strongly acid soils for rotations including alfalfa, clovers, and birdsfoot trefoil is about pH 6.5. The minimum level for fields with a cash grain system of farming is slightly less, about pH 6.0. A soil that is inherently at pH 6.3 and 6.4 may not need limestone.

Precision Spreading Sixth, I would like to see more attention given to precision spreading. A truck-spreading job such as is shown in the accompanying illustration reflects unfavorably on the limestone industry. Careless spreading contributes to the impression that limestone is cheap. And I don't mean just low in price. The attitude of farmers towards limestone must be upgraded. Incidentally, it will be extremely difficult to get representative soil tests for future limestone needs on this field because of the uneven application.

Finally, I wish that each limestone producer and distributor would ask himself this question: "What innovations have I made in processing or merchandising limestone within the last 10 years?"

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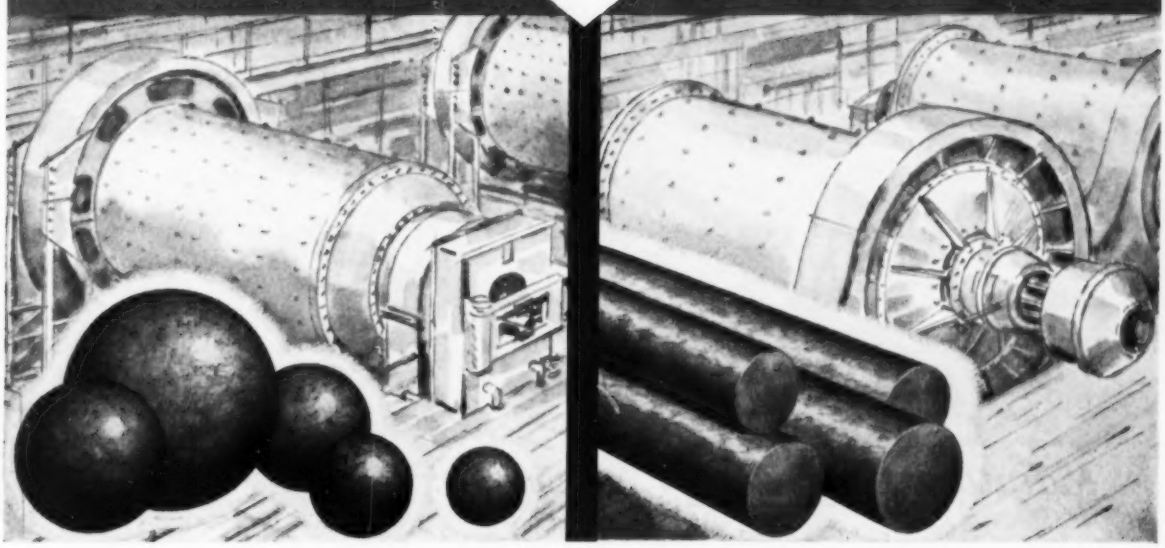

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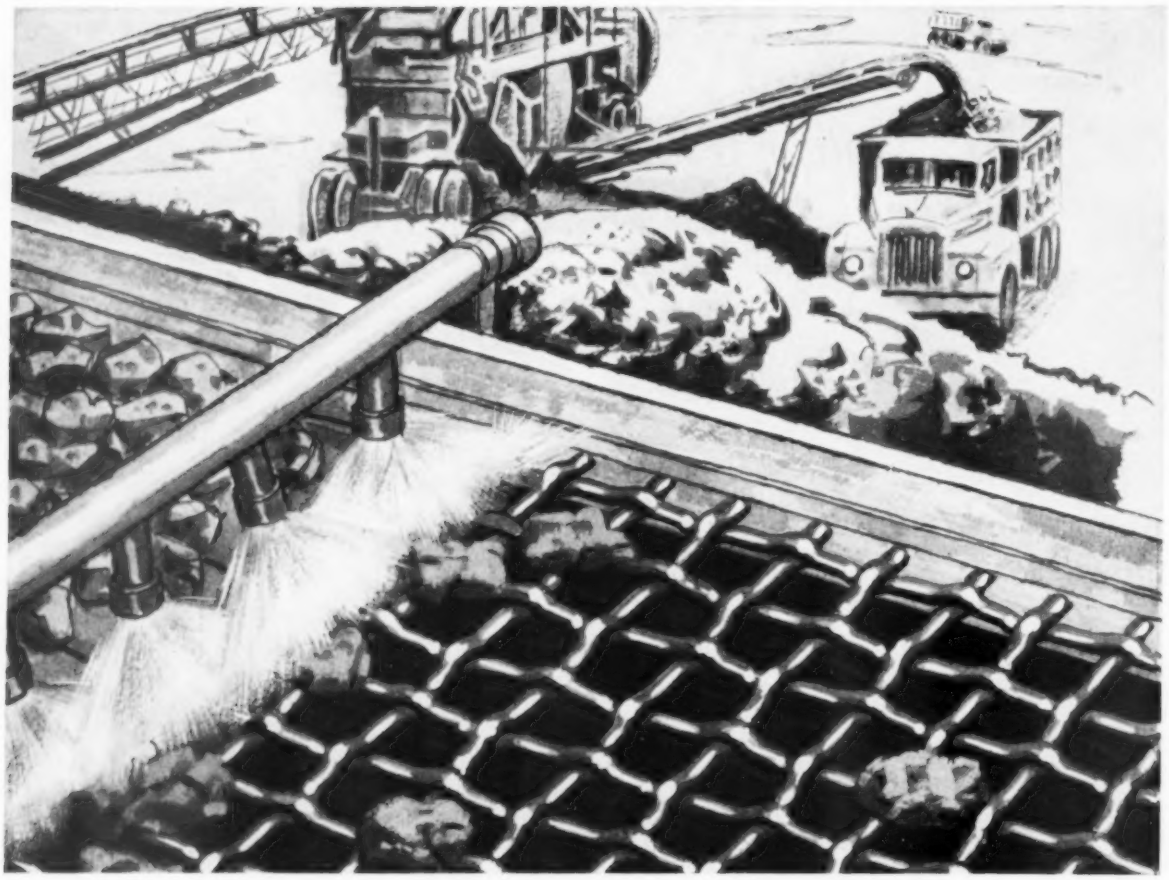

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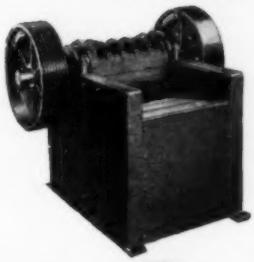
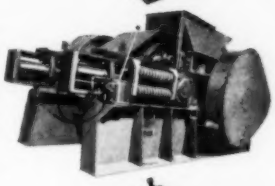


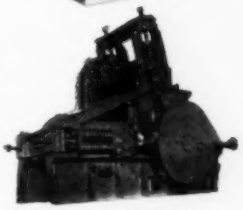
TWIN ROLL CRUSHER

PIONEER design makes 100% of roll shell available as crushing surface. Hydraulic adjustment simplifies setting crusher to meet product size. Shells are easily replaced without removing bearings from shaft. Driven by star gears, completely enclosed and running in oil. 2416, 3018, 3024, 4022, 4030, and 5424 sizes.



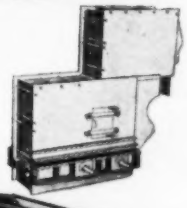
TRIPLE ROLL CRUSHER

Add a third roll and you have a triple roll crusher. This makes it possible to increase stage of reduction to as much as 6½". The Triple Roll Crusher is manufactured only by PIONEER. Available in 3018, 4022, 5424 sizes.



IMPACT BREAKER

The PIONEER 3648 Cuber is a multi-stage, regulated-flow impact breaker suitable for either primary or secondary crushing of relatively non-abrasive stone. Full gradation control. Capacity up to 150 tph of minus 1"; up to 350 tph of minus 3".



APRON FEEDERS

Heavy-duty PIONEER Apron Feeders have ½" thick, overlapping, forged steel pans carried on heavy chains supported on wide heavy duty rollers. Available with or without straight or flared sideboards. Widths 30", 36", 42", 48". Lengths 6', 8', 10', 12', 14' and larger.

PORTABLE APRON FEEDERS

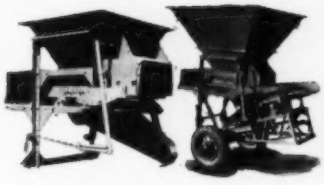
Mounted on pneumatic-tired chassis. Used in place of conveyor for feeding heavy, sharp, abrasive rock to portable primary crushing plant. Easily detached for quick job-to-job moves. Available in two sizes: 36" x 30' and 42" x 30'.

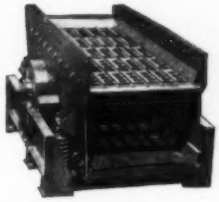
PIONEER ORO FEEDERS

The most rugged feeder made. Pans, rollers, drive sprockets and idlers cast from special high alloyed manganese steel. Pans are from 9/16" to 1" thick, depending on width of feeder. Chain links are cast as part of pan so there are no bolts or rivets to break or loosen. Available in 30", 36", 42", 48", 60", 72", 84" widths.

MECHANICAL FEEDERS

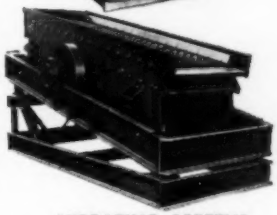
PIONEER Reciprocating Plate Feeders provide uniform flow of material to conveyors. Available in five different models.





MESABI SCREEN

This heavy-duty vibrating screen withstands heaviest loads. Frame is 18" car channel on I-beams reinforced with 8" wide flange beams. Pans are ¾" or ½" thick. Four bearing, heavy duty shaft. Seven sizes from 4' x 10' to 6' x 14'.

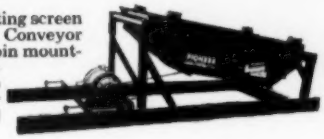


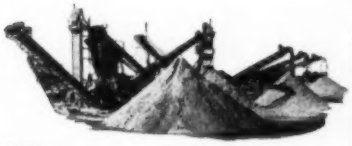
VIBRATING SCREENS

PIONEER'S full-circle throw gives same positive down-hill vibration at each end as in middle, thus every square inch works for you. Exclusive secondary spring suspension mounting effectively confines vibration to pan. 2 and 3 deck screens in 11 sizes.

BUZZER SCREEN

This small, compact vibrating screen fits on PIONEER Portable Conveyor and is also available with bin mounting. 3' x 6' size for production of ¾" material up to 50 tph; 4' x 8' size for production of ¾" material up to 90 tph.





CONVEYORS

Available in 18", 24", 30", 36", and 42" widths. Easy-to-erect *pre-engineered conveyors* range in length from 30' to 120' in 5' increments. *Job-engineered conveyors* for horizontal, extra long, or other special installations are available in any length from 12' up.

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For further information on any of the equipment described on this page or on PIONEER Portable Crushing and Screening Plants, Washing Plants, Bituminous Mixing Plants, *VIBROmatic* Bituminous Pavers, Conveyor Towers and Supports, Rock Ladders, Bins and other PIONEER Equipment, write or call Pioneer Engineering, Division of Poor & Company, Inc., Minneapolis 14, Minnesota or your PIONEER Distributor.

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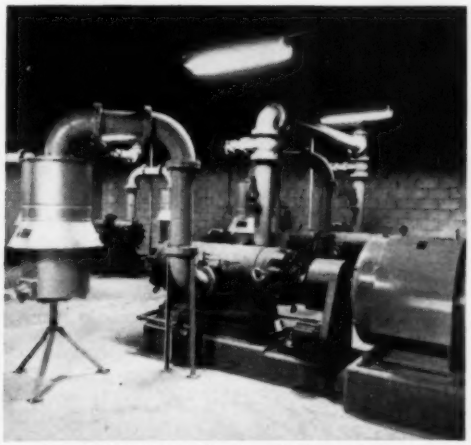
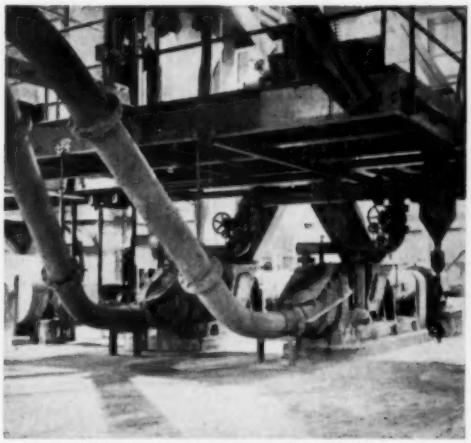
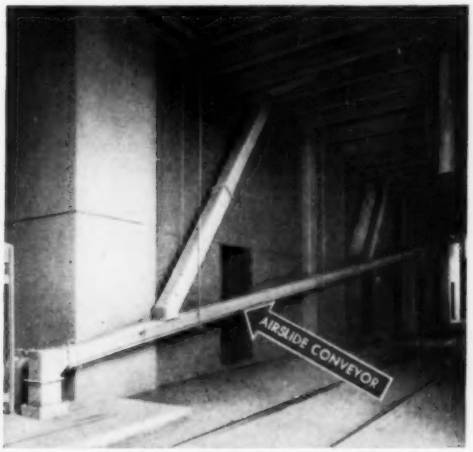


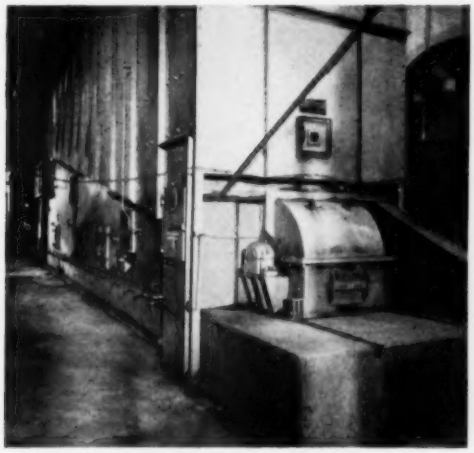
Group of C-300 single stage Fuller rotary compressors furnishing air for the Fuller-Kinyon pumps in raw-finish department.



Two 10" Fuller-Kinyon pumps in raw mill pumping material to blending silos.



F-H Airslide Conveyor under new finished cement silos feeding to Fuller-Kinyon pump for redistribution.



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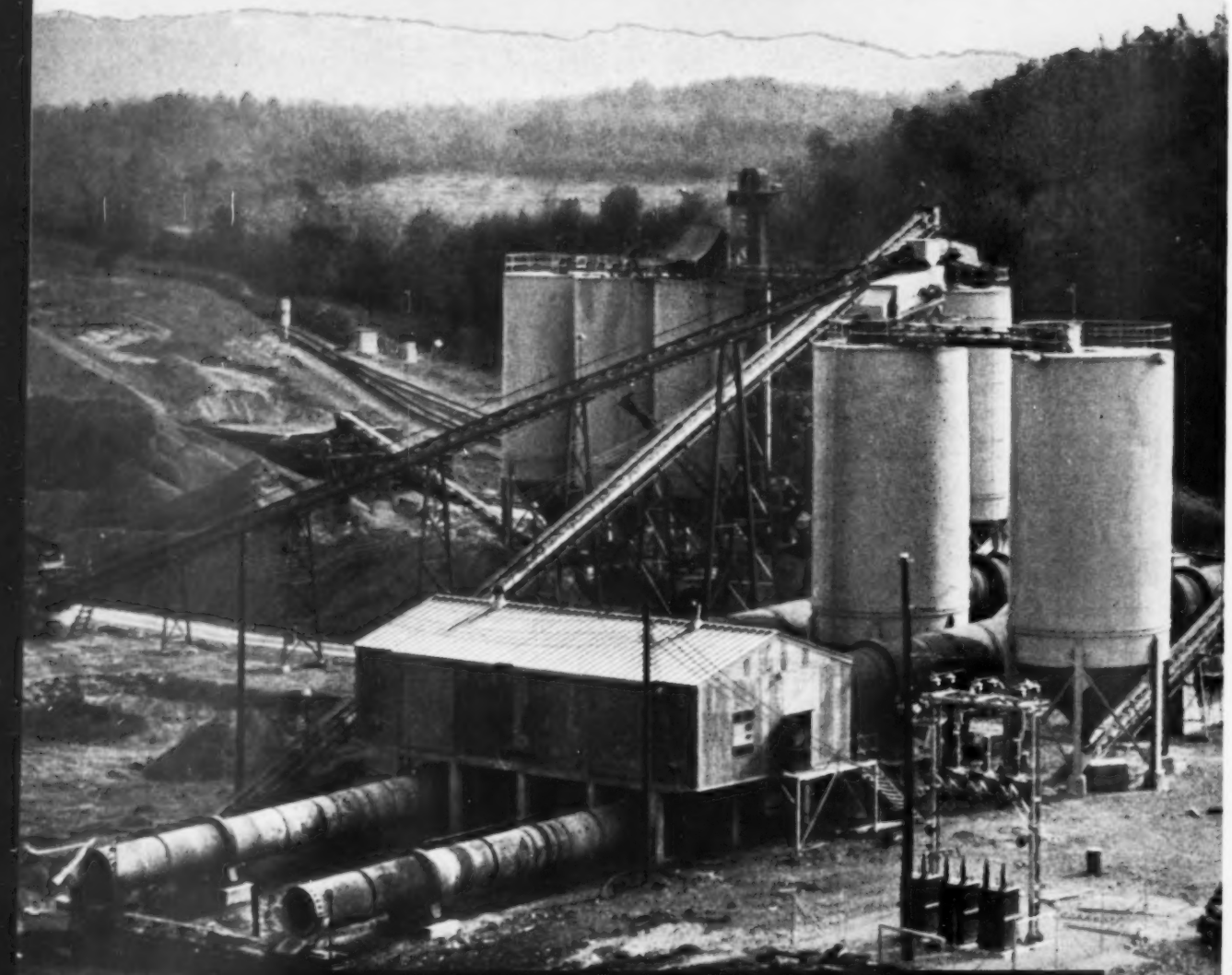

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Aerial Lime Spreading Techniques Demonstrated in Great Britain*

FOR the first time in Great Britain, aircraft manufacturers, component makers, and spraying contractors had an opportunity to display their latest equipment and techniques for spreading lime from the air. The demonstration was arranged by the Lime and Spreading section of the National Association of Agricultural Contractors at Cranfield Aerodrome near Bedford recently.

Previously aircraft were used in British agriculture primarily for the application of crop sprays, but their use for spreading lime and fertilizers is becoming increasingly important.

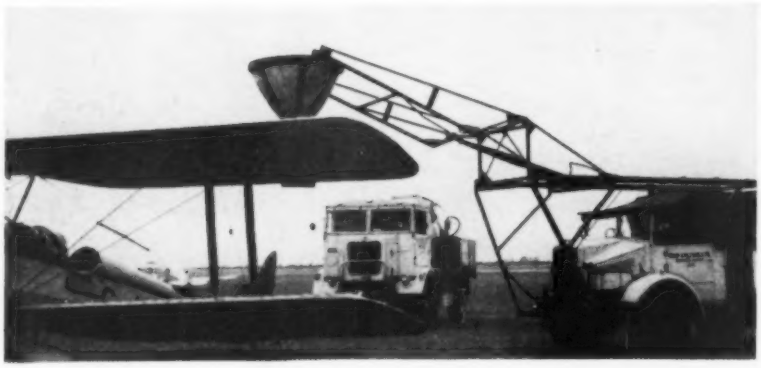
Three types of aircraft are currently being used. These include helicopters, single- and twin-engine, and fixed-wing machines. All three types have their advantages and disadvantages.

For liming operations, where it is necessary to carry high payloads, and the dressing per acre is in tons rather than hundred-weights, the spraying contractors prefer to use the larger twin-engine aircraft. However, the initial investment and maintenance costs are high, and a very long landing strip is required.

The areas to be treated with fixed-wing planes must be large and free from tall obstacles. This type of equipment can be used economically on tracts of mountainous peat bogs that are inaccessible to the conventional wheeled spreaders.

The display program at Cranfield Aerodrome was divided into three parts: (1) a flying exhibition put on by the contractors, (2) a demonstration for the aircraft manufacturers to show their planes, and (3) exhibits of chemical manufacturers, combined with the makers of aerial application equipment. Exhibits were entered from Canada, the United States, and Czechoslovakia, as well as the United Kingdom.

The fixed-wing aircraft shown had operational spreading speeds of over



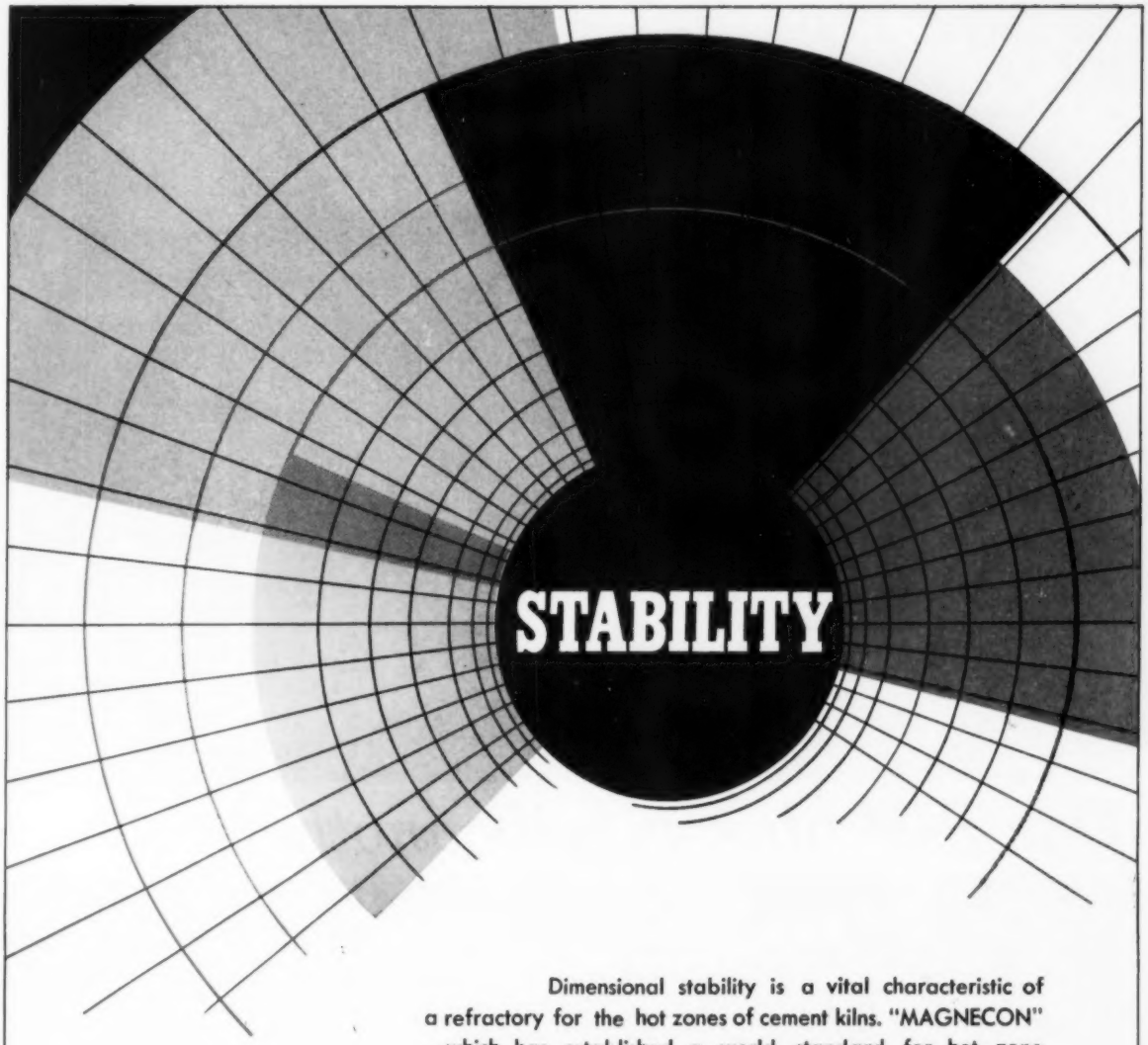
Trucks equipped with hoppers at the ends of booms simplify the rapid loading of lime into the bin mounted behind the pilot's cockpit. The hopper of the truck holds the same amount of material as that of the plane, and loading can be accomplished in as little as 7 seconds.

The French DJINN helicopter, driven by a turbine compression engine, proved to be the most maneuverable aircraft at the exhibit for spraying small patches of ground.

A DeHavilland Tiger Moth modified for spraying operations is equipped with a 10-cu. ft. hopper in front of the pilot's cockpit. The spraying equipment is mounted aft of the trailing edge of the lower wing.

*Abridged from *Cement, Lime, and Gravel*, December, 1959.

(*Continued on page* 156)



Dimensional stability is a vital characteristic of a refractory for the hot zones of cement kilns. "MAGNECON" —which has established a world standard for hot zone liners—has very high dimensional stability. "MAGNECON" was the refractory selected for seven of the largest cement kilns in the world, all newly completed or still a-building:

Miron Freres, Montreal, Que.
Kiln 550′ x 15′ diameter

Ciments d'Obourg, Obourg, Belgium
Kiln 525′ x 15′ 7″ diameter
Kiln 525′ x 14′ 7″ diameter

Dundee Cement Co., Dundee, Michigan
2 kilns 460′ x 16′ 6″—15′
—16′ 6″ diameter

Ciments Liegeois, Harcourt, Belgium
Kiln 475′ x 13′ diameter
Kiln 510′ x 14′ 5″ diameter

CANADIAN REFRACTORIES LIMITED
CANADA CEMENT BUILDING, MONTREAL, CANADA

1908

Two 4½ cubic yard P&H Model 1400 Electric Shovels owned by Marquette Cement Manufacturing Company, Chicago, Illinois are shown here loading hard limestone at the Marquette Cement Plant and Limestone Quarries near Oglesby, Illinois.

One P&H always sells another...

At MARQUETTE CEMENT COMPANY P&H "Profit·Tons" reduce loading costs all day... every day

Up to 10% more production, lower loading cost per ton and more net profit are the reasons why mining operators the world over are standardizing on P&H Electric Shovels. Actual job reports from P&H owners indicate that up to 30% higher bail pull maintains a more uniform dipper speed for faster filling in difficult digging. Also, greater job availability and the exceptional physical strength of P&H welded alloy construction are responsible for this outstanding performance.

P&H "Profit-Tons" are the end product of these exclusive P&H design principles:

MAGNETORQUE® puts more material into the dipper—faster—with every pass! It's the most productive digging motion drive known for electric shovels. This patented P&H drive electro-magnetically transmits the full digging power of an A.C. hoist motor direct to the dipper without motor generator set conversion to D.C. current. It gives higher bail pull, greater dipper fill factor and automatic impact protection to the digging machinery.

ELECTRONIC CONTROL . . . this patented P&H control accomplishes the quickest work motion reaction time known on electric shovels. Control maintenance expense is reduced as much as 80% by elimination of all moving parts for a completely closed circuit system.

In addition, with P&H—and only with P&H—do you get the service assurance of single source responsibility. P&H manufactures their own electrical as well as mechanical components—designed specifically for electric shovel service. Write Dept. 500A, Construction & Mining Division, Harnischfeger Corporation, Milwaukee 46, Wisconsin.

HARNISCHFEGER

Milwaukee 46, Wisconsin

P&H

P&H LINE:

Electric Excavators:	3½ through 10 yds.
Diesel Excavators:	½ through 3½ yds.
Truck Cranes:	10 through 80 tons

P&H equipment is also manufactured in Australia, Brazil, Canada, Germany and Japan.

Enter 154 on card, page 233

Experienced kiln operators insist on
RINGBLASTER and Western

Super-X lead slug shell—8900 ft./lbs. muzzle energy
Shell—New paper tube—slug
Reduced velocity shell—7500 ft./lbs. muzzle energy
Super-X Zinc slug shell—penetrates deeper—for extra hard rings
Ringblaster kiln gun

THE DEPENDABLE, ECONOMICAL WAY TO SMASH KILN RINGS

Year after year industry's "first-team" for fast, low-cost "ring-smashing" in all kinds of rotary kilns has been Ringblaster and Western Industrial Shells. Constant research in the Winchester ballistics labs has led to many tested improvements. The latest is a scientifically impregnated slug jacket which insures maximum power by sealing extra force behind the slug. This new tightly-rolled paper jacket is now standard on the Super-X and low-velocity lead slug shells. It is designed to eliminate even the slightest fragmentation of the lead slug, and reduces Kiln Gun maintenance problems to the lowest possible level.

With improved Western shells, Ringblaster is an even better choice for accurate ring smashing with a minimum of time, trouble and expense. Requiring fewer shots to do the job, Ringblaster cuts kiln down-time to a new low . . . makes any kiln operation more efficient. Write for details today.

RINGBLASTER KILN GUN *another product by*
Ramset® Fastening System
OLIN MATHIESON Chemical Corporation — WINCHESTER-WESTERN DIVISION 300-E Winchester Ave. • New Haven 4, Conn.

Enter 156 on card, page 233

Aerial Lime Spreading

(*Continued from page* 152)

50 m.p.h. The difficulties of achieving an accurate lime spreading at this speed can be appreciated. The turning or maneuvering distance required at these speeds adds to wasted flying time and increases costs.

In spreading lime and fertilizer, with the average rate of application 1 to 4 cwt. per acre, twin venturi tubes mounted under the fuselage were fed from hoppers in the body. Fison-Airwork, Ltd., displayed a rotary distributor fed from a hopper mounted behind the pilot's seat. It can cover a 100-ft. swath at 65 m.p.h. at an altitude of 20 ft.

The single-engine fixed-wing aircraft normally carry payloads of about 1,000 lb. and therefore require more frequent refilling. Some of the contractors have developed a rapid ground reloading technique, often requiring as little as 7 seconds. This rapid reloading is achieved by using tractors or trucks equipped with a small hopper on the end of a jib at the front of the vehicle. These hoppers have the same capacity as the aircraft hopper. One simple loading operation delivers the right amount of spray material to the aircraft.

Particularly interesting was the L-60 Brigadyr from Omnipol of Prague. This plane, fitted with full-span, interconnected slots on the leading edge of the wings and conventional trailing flaps, had a minimum true air speed of 40 m.p.h. heading into a 20 m.p.h. head wind, which gave a relative ground speed of 20 m.p.h. Landings and takeoffs were described as being "off a six pence."

At the exhibition Auster Aircraft, Ltd., introduced its Agricola—the first aircraft in the world specifically designed for spraying. Another example of the heavier, single-engine aircraft was the Beaver, manufactured by De Havilland Aircraft of Canada, Ltd.

The most popular aircraft for spraying in the British Isles is the helicopter, because the characteristic size of a field is 20 acres. A helicopter can operate from a corner of the small field that it is spraying; it is more suitable for spraying over broken terrain; and it can be used close to large obstacles and trees.

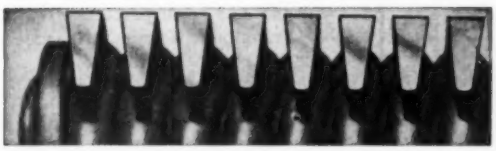
The demonstrations brought home

HOW TO SELECT DEWATERING SCREENS THAT FIT YOUR REQUIREMENTS EXACTLY

How to select Perforated Plate

Let Hendrick suggest the analysis of H Quality Steel that will stand up longest under your operating conditions. Eliminate blinding with a Hendrick screen that provides full clearance. Get continued product uniformity from the accurate, uniform mesh of a Hendrick screen.

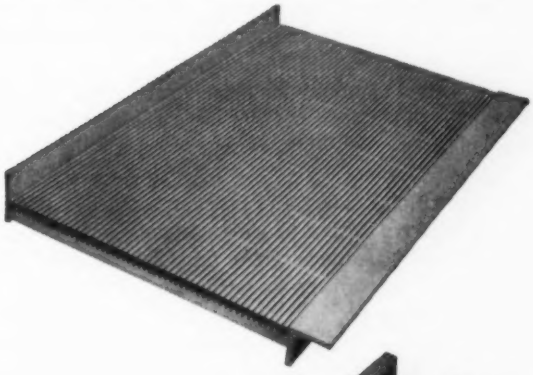
How to select Wedge Wire

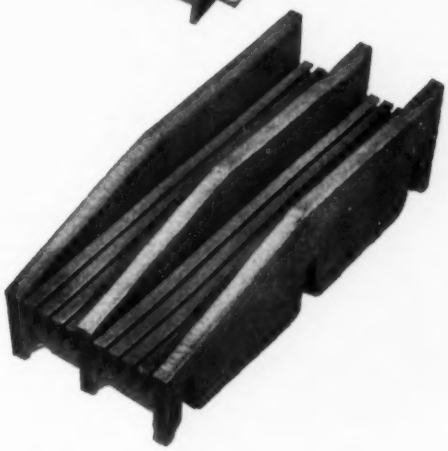


Here are three things to look for: 1) Free clearance—to reduce chances of clogging and blinding. 2) A tapered profile bar, for dewatering efficiency. 3) A deep profile bar, to assure long service life and maximum load-carrying capacity. Get all of these in Hendrick Wedge Wire. There is a type to suit your operating conditions and your needs—whether you want good screening efficiency, good dewatering efficiency, or high resistance to abrasion.

How to select Wedge Slot Screens

For more efficient processing, look for accurately spaced, uninterrupted slots. For heavy-duty service, look for thick, parallel head flanges that maintain uniformity of openings. To prevent abrasion by large chunks, specify Skid Bars. Hendrick offers all of these—*plus* 8 different profile bars. Hendrick will gladly help you select the type that will stand up best under your operating conditions.





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39 Dundaff Street, Carbondale, Pa.

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☐ I would appreciate a call from a Hendrick Sales Engineer.

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City_____ Zone_____ State_____

"My Boss Read the Specs with Tears in His Eyes"

He looked like he'd lost his best friend — money.

"Goodbye contract," he said quietly. "We just can't hope to meet these government specifications for aggregate."

"Yeah, it's pretty hopeless with our set-up. Of course, if we had a hydraulic classifier — " (I was kidding.)

"You're out of your mind. Around here water costs more than sand."

"Well how about an air separator, like Sturtevant makes?" I shot back. "Pete's brother runs a pit at Rapid City and says they clean sand without water. By de-dusting it."

He was skeptical. "Aren't Sturtevants for cement?"

I nodded. "They are, but you see quite a few in aggregates, too, nowadays. Might be worth a try."

The Boss smiled for the first time that morning. "What the heck are you waiting for? Get 'em on the phone and let's see what they can do."

So we got the contract, thanks to the 12 ft. Sturtevant we now use for de-dusting and pre-classification. It's a beaut. Gives good service outdoors the year round, with no protection except for the motor housing.

If you're in this business, Brother, it might pay you to have a good long look at what a Sturtevant can do for tight aggregate specifications.

Sturtevant Air Separators classify production loads up to 150 tph by exact control of air currents and centrifugal force. Simple, quick adjustments make possible the selection (or rejection) of particles in the 30 to 400 mesh range. Nine standard models available, varying in size from 3' to 18'.

Learn how a Sturtevant Air Separator can help your aggregates production. Write today describing your needs. Address: Sturtevant Mill Co., 104 Clayton St., Boston 22, Mass.

STURTEVANT AIR SEPARATORS CLASSIFY SAND WITHOUT WATER

PRODUCING CLEAN SAND, the Sturtevant acts as a de-duster by removing fine mesh particles from the throughput. Particularly valuable where water is limited.

EASING SCREEN LOADS, the Sturtevant rejects unwanted fines and circuits coarser sizes to screens for grading. By this pre-classification, the possibility of blinding screens with fines is minimized and output considerably increased. Also, excessive dust problems are eliminated.

WHEN BLENDING IS NECESSARY, the Sturtevant selects fines from the crushing operation. This stockpiled product then can be used in the blending operation to overcome fineness modulus deficiencies.

GRINDERS
CRUSHERS
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MICRON-GRINDERS

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Dry Processing Equipment

The "OPEN-DOOR" to *lower* operating costs over *more* years

MIXERS
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ELEVATORS
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the fact that the downdraft from the helicopter rotors forced the spray vertically downward, and drift and wind losses were kept at the minimum. The major disadvantages of the helicopter are its high initial cost, high maintenance figures, and small payloads.

High spot of the show was the little DJINN helicopter, equipped with a 240-hp. Palouste IV turbine compressor engine. This craft was demonstrated by Helicop-Air in collaboration with Crop Culture (Aerial), Ltd. The maneuverable little machine treated the long, five-acre test strip from end to end and then flew under the end marker fences to fill the corners.

Then as a further demonstration of its capabilities, it sprayed the strip from side to side, turning virtually within the boundaries of the field and finally rose vertically for several hundred feet.

It is only during the last two years that aircraft have found their true place in British agriculture. Only work that can be done by no other means should be considered for aerial treatment. There is a dangerous tendency to use aircraft as a new gimmick for agricultural sales.

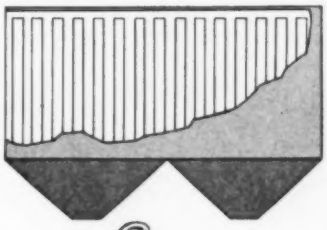
Previously, aircraft were used in the United Kingdom for very short seasons between the longer overseas contracts where more than 150 acres an hour can be treated successfully. In Great Britain, where only 30 or 40 acres an hour is considered normal, costs have to be very tightly controlled in order to get an economical operation.

Considerably more work is being undertaken each year. By the end of 1959 Fison-Airwork, Ltd., had treated almost 3,000,000 acres with various materials. Although aircraft can be used to treat large areas of land in a very short time, they must not be regarded as a panacea for all evils. This point was emphasized, and the valuable future contribution of aircraft for lime spraying was admirably demonstrated at Cranfield.

JOSEPH MAERTENS SR., 73, president of Maertens Sand and Gravel Company, Romeo, Mich., died recently in a Detroit hospital after a brief illness.

SINCE 1876 SLY

SLY DUST FILTERS For FULL-TIME OPERATION

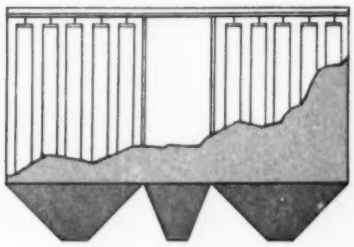


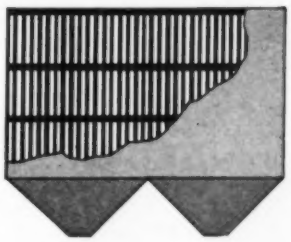
1900's SLY INTERMITTENT DUST ARRESTER

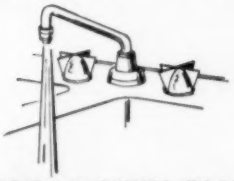
Required complete shut-down periodically for filter bag cleaning.

1930's SLY AUTOMATIC CONTINUOUS TUBE-TYPE FILTER

Sections had to be shut-down alternately for cleaning. Varying suction resulted in incomplete collection.







TODAY NEW SLY "ROLL-CLEAN" DYNACLONE®

Provides uniform suction at dust sources to collect all the dust.

Continuous Dust Suppression Through Constant Suction

The Dynaclone operates continuously, 24 hours a day if required. There is no fluctuation in air volume. This means complete dust collection.

The Dynaclone keeps itself clean automatically. Resilient rubber rolls form a positive seal as each row of bags is cleaned by atmospheric air. A single exhaust fan provides *both* suction for dust collection and air for cleaning. No auxiliary blowers required.

The Dynaclone provides 20 to 40% more cloth in a given space than any other dust filter. Space saved means lower installation costs, simplified piping and ductwork.

New "Resist-O-Wear" filter bags offer 2 to 3 times more bag life. And any bag can be changed without disturbing any other.

More than 40,000 Sly Dust Filters in operation, including over 1,000 Dynaclones. Get complete details . . .

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THE W. W. SLY MANUFACTURING CO.

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● When the Ash Grove Lime & Portland Cement Company's plant at Springfield, Mo., had achieved ten years of operation without a lost-time accident, management had this sign erected on the plant grounds. The number is moved up each day, so that all motorists traveling on this road will be constantly reminded of the local industry's safety record. This plant was awarded a Certificate of Achievement in recognition of its perfect safety record at the operators' meeting of the National Lime Association, held in Philadelphia last October.

Production began in March, exactly on schedule, at National Gypsum Company's new multimillion-dollar gypsum plant in Lorain, Ohio. Products include lath, plaster, wallboard, and sheathing. Completion of this plant caps a three-year Great Lakes area expansion program.

HAYWARD CLAMSHELL BUCKETS

WORK LONGER,
WORK FASTER,
WEAR LESS!

Designed with rugged, one-piece alloy shells ... wide type, cast manganese steel cutting edges ... smooth shell interior for fast, capacity loads and easy discharge ... manganese bushings ... diagonal truss brace to keep shell in line ... has no side sway or back lash ... *plus many other cost-cutting design features!*

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Builders of Better Buckets Since 1888

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Indiana Mineral Group Hears Research Reports On Agricultural Limestone

Records for attendance were broken at all sessions of the 1960 annual convention of the Indiana Mineral Aggregates Association during the April 11 meeting at the Claypool Hotel, Indianapolis.

At this session the following officers were elected for 1960: president, A. F. Dunkin, Muncie Stone and Lime Co., Inc.; vice-president, J. H. Law, Western Indiana Gravel Co.; secretary-treasurer, M. G. Johnson, The Mermon Gravel Co.; and engineer-director, Ralph E. Simpson.

A very satisfactory financial report for 1959 was given, and a discussion was held on proposed changes in Indiana state highway department specifications. Later the members heard a paper pertaining to scales and the mineral aggregates industry, presented by Rollin E. Meek, director, Indiana State Division of Weights and Measures.

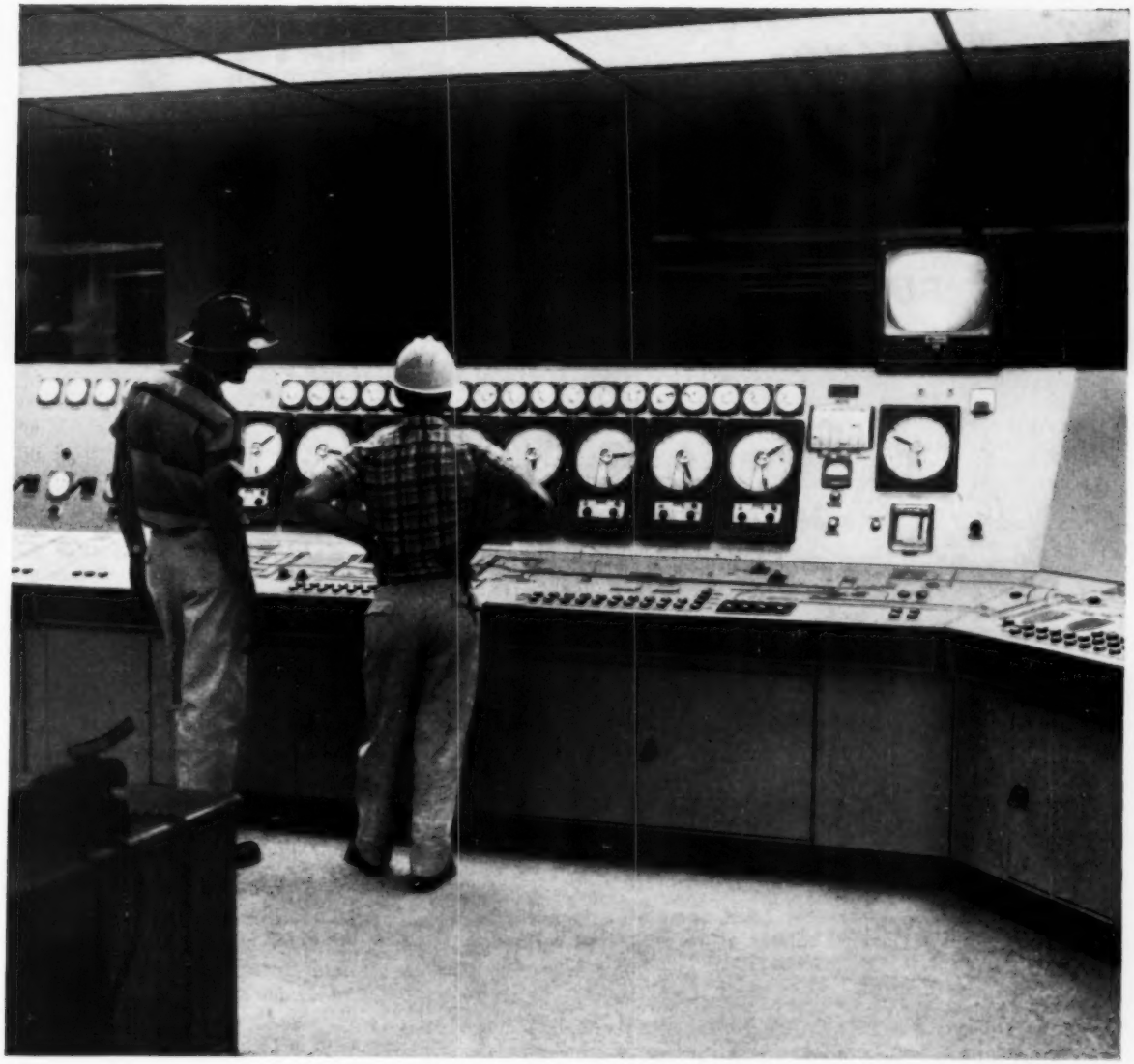
This meeting was followed by a down-to-earth conference on agricultural limestone. Dave Grimes, aglime technical director, was moderator of this session which featured a progress report of research on agricultural limestone at Purdue University, given by Dr. Stanley A. Barber.

Dr. Barber summarized the results of the Mulzer Brothers grant-in-aid and outlined the new research, which will be partly financed by the oversubscribed contributions of several members of I.M.A.A.

At an earlier meeting, held on March 29, executives representing a major proportion of the active membership of the association conferred on management problems. From this discussion some frank and helpful comments were developed.

The members concluded that abnormal production engenders abnormal expenses and abnormal consequences, and that the producer should be paid for these abnormal circumstances.

Joe Gray, director of engineering, National Crushed Stone Association, showed a film on graded aggregate base course construction which was viewed by all of the supervising engineers from the Indianapolis headquarters and district offices.



Is this a cement plant?

Yes . . . and as you step into the quiet cleanliness of this air-conditioned room, you take a step into the "future" . . . a future that today, for you, can become a reality.

In the quiet of the control room, an operator monitors every step in the cement-making process at Ideal Cement Company's new Tijeras, New Mexico plant.

One man operates the latest electronic instruments, directs, records and controls the flow of material into the entire production process . . . from the crusher to the final cement storage silos.

At modern plants like Tijeras you find L&N's Speedomax H up front, measuring, recording . . . keeping a watchful, dependable eye on the process.

If you're thinking of the future, or thinking of today, a call to your nearby L&N office can be the first step to more profitable operations with Speedomax H . . . the ideal instrument for rotary kiln control.

At your service is the most experienced supplier of rotary kiln instrumentation and controls: Leeds and Northrup Company, 4977 Stenton Ave., Phila. 44, Pa.

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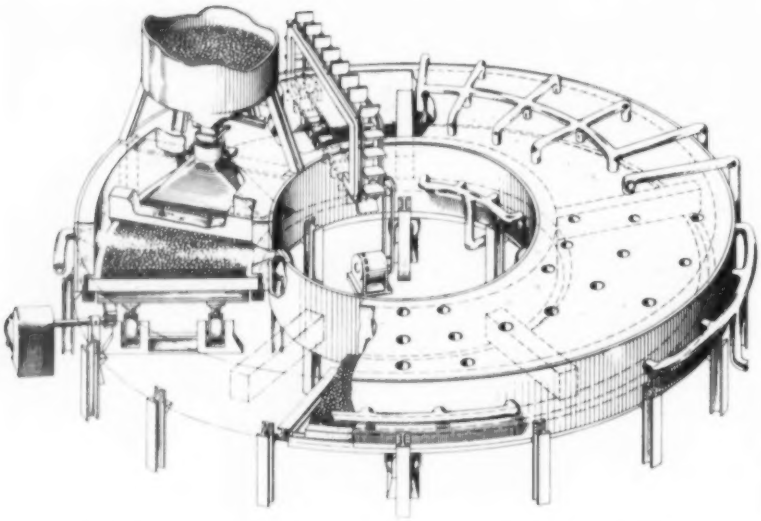
Announcing

CALCIMATIC

A NEW CONCEPT IN THE BURNING OF LIME

PATENTS PENDING



Sufficient work has now been completed in our Pilot Plant in Missouri to enable us to make the following statements for CALCIMATIC:

QUALITY—100% Lime—No Core
FLEXIBILITY—**Any** Stone, **Any** Size, **Any** Fuel
CONTROLLABILITY—**Exact** Control of Time and Temperature
AUTOMATION—Loads, Controls and Unloads **Continuously**
CAPACITY—**Any** Size Small or Large
CAPITAL COST—**Less** per Ton of Saleable Lime
MAINTENANCE—**Less** per Ton of Saleable Lime
POWER REQUIREMENTS—**Less** per Ton of Saleable Lime
EFFICIENCY—**Better** per Ton of Saleable Lime
DUST—None

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Construction Put in Place Rises 5 Percent in March But Less than Expected

The value of new construction put in place in March amounted to $3,700,000,000, according to preliminary estimates of the U.S. Department of Commerce. This figure was up only 5 percent from February (this seasonal increase is usually 8 percent) and it was 4 percent below figures for March, 1959.

ITEMS: private construction, estimated at $2,700,000,000, was up 4 percent from February, but less than seasonally expected. Residential was valued at $1,400,000,000—up 6 percent—and non-residential was valued at $745,000,000—down 2 percent.

ITEMS: public construction, estimated at $1,000,000,000, was up 8 percent from February, but 14 percent below March, 1959. Highway expenditures showed a normal seasonal rise.

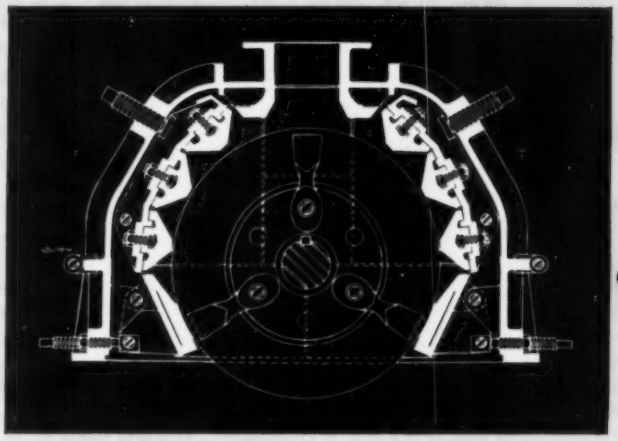
CUMULATIVE TOTAL for the first three months is $10,900,000,000—down 2 percent from the same period last year. This puts the seasonally-adjusted annual rate of total construction expenditures at $52,900,000,000 in March, down from $54,500,000,000 in February.

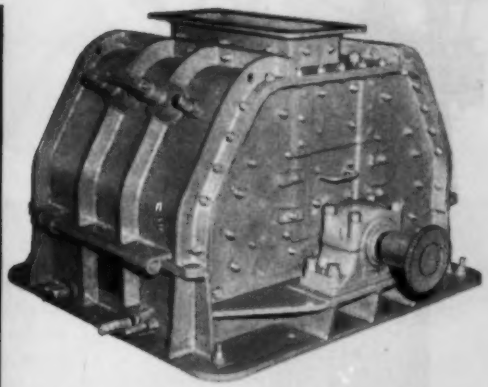
10,000th Member Greeted At A.S.T.M. Committee Week

More than 1,400 persons attended the Committee Week of the American Society for Testing Materials held in Chicago's Hotel Sherman in February.

Special recognition was given, at the Committee Week dinner, to the induction of the organization's 10,000th member, Robert J. McCallin, technical service supervisor, Medusa Portland Cement Company, Wampum, Pa.

During the five-day event 35 technical committees held 351 meetings of subcommittees and working groups. Among the committees which met in Chicago were the following: C-7 on Lime, C-8 on Refractories, C-11 on Gypsum, C-12 on Mortars for Unit Masonry, C-15 on Manufactured Masonry Units, D-4 on Road and Paving Materials, D-8 on Bituminous Materials, E-5 on Fire Tests of Materials and Construction, and E-17 on Skid Resistance.





● Pennsylvania CD Series Reversible Impactor with adjustable upper and lower breaker blocks.

WHY PENNSYLVANIA REVERSIBLE IMPACTORS HELP YOU LOWER YOUR REDUCTION COSTS

The Pennsylvania-pioneered reversible impactor is known throughout the industry for its amazing economy. Here's why.

1. "Free air" impact crushing, with elimination of attrition, means lower reduction costs. Material drops through centrally located feed chute, penetrates deep into path of beaters, is struck, shattered, driven against massive anvils, and is again struck by rotating beaters.

2. Low power requirements, because of large working clearances. There are no cage bars or screens in an impactor. Feeds get through quickly. More product per hour.

3. Push-button reversal. Rotor can be reversed and new sets of hammer faces and breaker blocks are provided on the other side of the mill. No time out or manual hammer turning. Identical product in either direction.

4. Adjustable breaker blocks. As wear occurs, simply move blocks toward hammer circle . . . more constant tonnage, uniform product, more tons crushed per set of hammers.

FREE BULLETIN

Because of the wide range of application, Pennsylvania Reversible Impactors are made in a number of types. For complete description of all types write for Bulletin 6018.

PENNSYLVANIA CRUSHER DIVISION
BATH IRON WORKS CORPORATION
WEST CHESTER, PENNA.

★ ★ ★

Over 50 years' concentrated experience in all types of material reduction makes Pennsylvania your best source of crushers and engineering advice and service. Call on Pennsylvania with your next crushing problem. Representatives from coast-to-coast.

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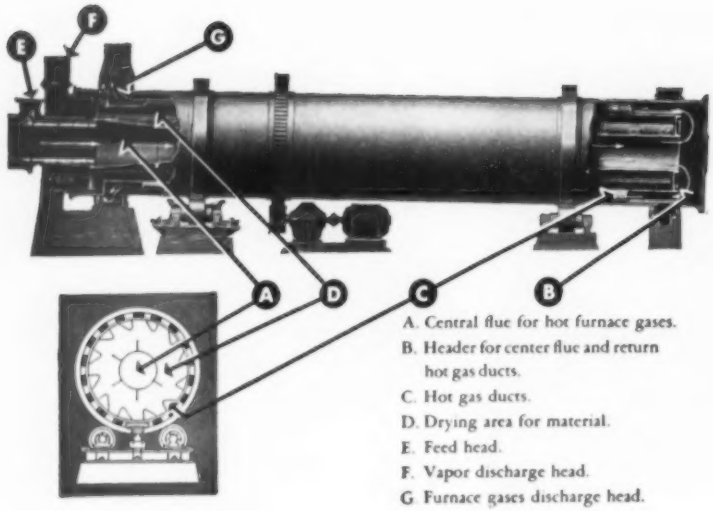

A. Central flue for hot furnace gases.
B. Header for center flue and return hot gas ducts.
C. Hot gas ducts.
D. Drying area for material.
E. Feed head.
F. Vapor discharge head.
G. Furnace gases discharge head.

Ruggles-Coles INDIRECT-FIRED DRYERS and HEATERS

- Dry without contamination from combustion gases, regardless of fuel.
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- Collect vapors at high concentration.
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1959 Supplements Now Available For Book of A.S.T.M. Standards

The ten 1959 supplements to the *Book of A.S.T.M. Standards* (issued triennially) have been recently published. They contain (for each of the ten parts of the book) latest standard specifications, tests, definitions, and recommended practices which are being issued for the first time or revised since their appearance in the 1958 Book of Standards.

Supplement to Part 4, *Cement, Concrete, Mortars, Road Materials, Waterproofing, Soils,* includes 42 standards for lime, cement, gypsum, chemical-resistant mortars, aggregates, concrete, curing materials, bituminous materials, water-proofing materials, and soils.

Supplement to Part 5, *Masonry Products, Ceramics, Thermal Insulation, Acoustical Materials, Sandwich and Building Constructions, Fire Tests,* contains 36 standards for asbestos-cement products, manufactured masonry units, pipe and drain tile, refractories, porcelain enamel, glass, thermal insulating materials, and tests for building constructions and fire tests.

The supplements, bound with heavy paper covers, are available from the American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa. Price, $4 each.

Conveyor to Replace Trucks At U.S. Borax & Chem. Plant

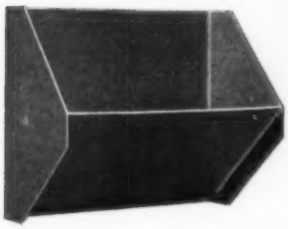
A 1,300-ft. conveyor system will be installed by the United States Borax & Chemical Corporation to reduce the cost of transporting borate ores from its open-pit mine to the surface plants at Boron, Calif.

The conveyor system will replace the trucks that currently carry ore 2½ miles from the bottom of the pit to a surface ore crusher. By means of the new continuous-belt operation, ore will be raised 315 ft. to the surface, where a new hammermill will be installed. From this point it will be carried to an ore crusher, and a conveyor will move it to stockpiles adjacent to the firm's $20,000,000 processing plants.

The pit is 2,000 ft. long, 1,700 ft. wide, and 275 ft. deep. Current borate reserves are sufficient to last at least 100 years.

WHAT WERE YOUR CONVEYING / ELEVATING COSTS LAST MONTH?

Industries cut costs month after month with Standard Metal Equipment



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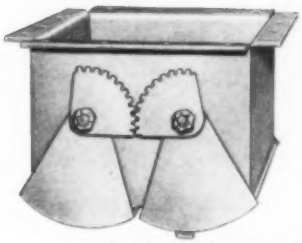

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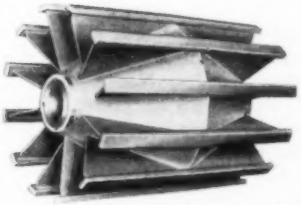

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Contact us for full details and quotations on your particular needs in elevating and conveying equipment—for new installations or replacements. Ask for the catalog showing the complete Standard line.

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Raymond ROLLER MILL

...for the modern dry-processing of CLAYS

THE Raymond Roller Mill with its proven advantages and rugged dependability is recognized as the standard pulverizing unit in many fields of clay products manufacture.

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Its principal features include:

1. Drastic reductions in labor requirements.
2. Close control of variables, which improves product quality.
3. Completely automatic, dust-free operation.
4. Reduction of maintenance problems.

• • • • • •

Raymond Roller Mill equipped with Flash Drying accessories for drying and grinding simultaneously.

In a typical installation for a wall tile manufacturer, the mill receives clay containing 5% moisture, and delivers 10 tons per hour of dry product at a fineness of 98% minus 200 mesh. In a pottery plant, the Roller Mill is dry-grinding the clay at 90% minus 200 mesh, and delivering 8 tons per hour to a pug mill where the maximum requirement of water is added ahead of the extrusion operation.

The Raymond Roller Mill is available in a wide range of capacities, and can be set up with Flash Drying accessories for simultaneously drying, grinding, classifying and conveying the product to storage.

Write for Catalog No. 79 describing Roller Mills, and for Catalog No. 87 with data on Imp Mills, covering a wide range of applications in drying-grinding problems.

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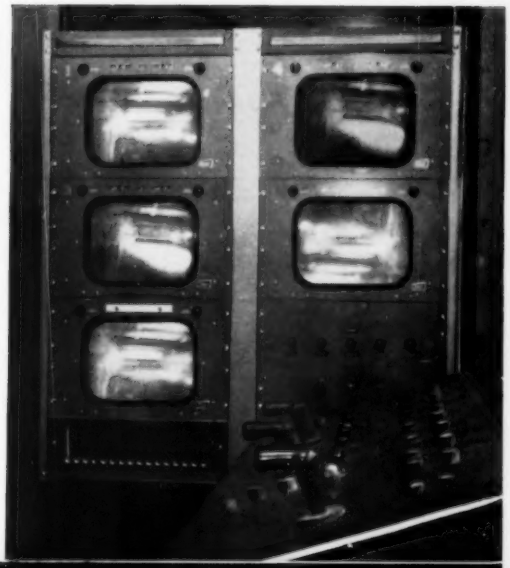

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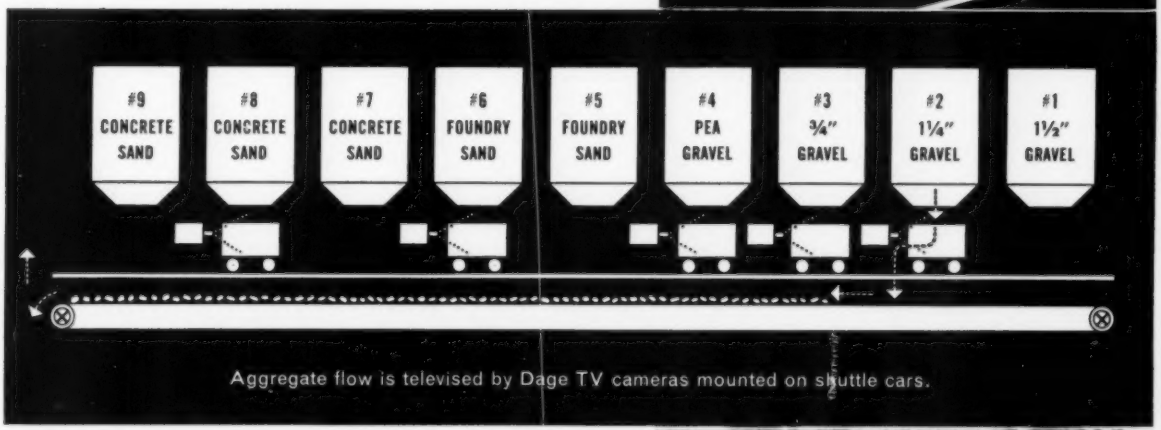
Helps Increase Aggregate Production



Aggregate flow is televised by Dage TV cameras mounted on shuttle cars.

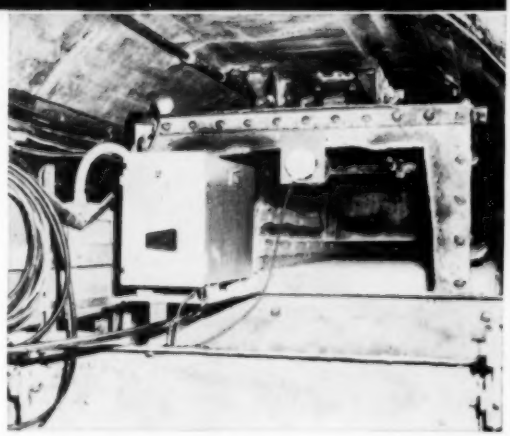
A Dage closed-circuit television system is enabling The Construction Aggregates Corp., Ferrysburg, Mich. plant to further mechanize its aggregate processing cycle.

Self-propelled shuttle cars acting as feeders deliver the various aggregate mixes along a 1968 ft. conveyor belt. On each of the five cars is mounted a Dage industrial TV camera which transmits the action to TV screens in the finished product control center. One operator watches the aggregate movement and shuttle cars on any one of five TV screens.

Advantages of the system are multiple: Increased production at lower cost; centralized control; upgrading of employees; elimination of potential safety hazards.

Dage research and development engineers have designed many closed-circuit systems for industrial use. The newest of these is the ruggedized RGS-10 system which consists of transistorized TV camera and camera control capable of operation 2000 feet apart. The system is particularly applicable in areas normally prohibitive to television equipment.

For complete information about the RGS-10 system or for consultation about the use of closed-circuit TV in your industry, write to Dage Television. No obligation.



Dage TV camera mounted on shuttle car televises loading conditions.

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SMIDTH
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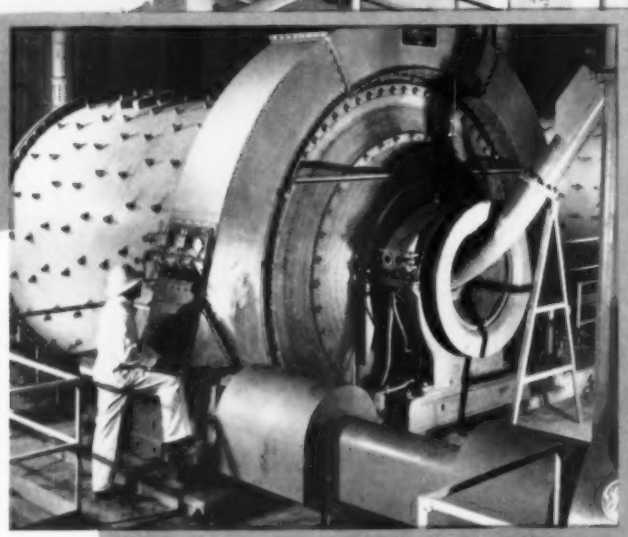

Ball Mills and multi-compartment Unidan Mills for wet and dry, open and closed circuit grinding and airswept Tirax Mills for simultaneous drying and grinding.

Special features include the Smidth slide shoe bearing and the Symetro Drive.

Upper photo: Unidan Mills, Symetro driven, with one slide shoe and one trunnion bearing.
Lower photo: Gear driven Ball Mill.

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Enter 168 on card, page 233

Problem: adequate material supply
Solution: new sand-gravel plant

efficient 200-t.p.h. operation supplies paving needs at more favorable cost

By BUREN C. HEROD

TWO factors—consistent supply of material and material costs—were paramount in the development of an 18-month old sand and gravel operation near Lake Ariel, Pa. It also represents another instance of a long-established contractor becoming a member of the aggregates producing industry in order to hold the line a little tighter on costs of raw materials required in construction projects. As in most other similar situations, aggregates produced in excess of the latter requirements are made available to the commercial market.

Two years ago the management of the Keystone Pavement & Construction Company began considering plans for incorporating an aggregate production facility in their existing operations. These plans stemmed directly from a situation in which profit from paving projects was being caught in the squeeze between bid ceilings and operating expenses—including both labor and materials.

This planning was brought to fruition with the retention of A. R. Amos, to design a sand and gravel plant. By June, 1958, a highly flexible facility, rated at 175 to 200 t.p.h., had been constructed and placed in operation.

A considerable portion of the output is consigned to use in the bituminous batching plant from which the firm's paving projects, up to 35 miles distant, are supplied. The remainder is sold on the open market in an area within a 20-mile radius of Lake Ariel.

The 60-acre tract on which both the aggregate plant and the bituminous mixing plant are located contains sand and gravel to a considerable depth—with estimated reserves much in excess of anticipated requirements, according to a company official. The excellently graded material, in place, averages about 40 percent gravel and 60 percent sand. A very nominal amount is more than 10 in. in size.

In order to take most effective advantage of the depth of the deposit, and at the same time avoid creating an excessively steep truck haul, the area was opened on the perimeter, and is being worked down through the deposit on a circular pattern. The material is excavated with a 1¼-cu. yd. Osgood diesel shovel, and is hauled to the plant feed hopper in a pair of 20-ton Sterling end-dump trucks.

Beginning with the primary crushing installation, the plant incorporates Telsmith equipment in most

This overall view of the compact, flexible Keystone operation shows all phases of the plant except the primary crusher (out of view at the right).

The pit operations, in excellently graded material, are conducted on a circular pattern, working in from the perimeter and down through the deposit.

major processing phases. These include the primary jaw crusher, one of the secondary crushers, all screens, a drag classifier, a twinscrew classifier, and the dump hopper plate feeder. Most screening surfaces are fitted with hexagonal opening Cross Engineering perforated plate screencloth. Barber-Greene conveyors are used throughout. The overall operation has a total connected power load of about 200 hp.

Any plus 10-in. material in the pit-run loads dumped into the 40-ton plant feed hopper are removed on an overlying 10-in. spacing stationary bar grizzly. From the hopper, the material is transferred on a 2- by 5-ft. reciprocating plate feeder to the scalping screen.

The scalper, a 4- by 10-ft. double-deck unit, makes a separation of plus 2½-in. and plus 1⅛-in. products on the upper and lower decks respectively, the top fraction being chuted to the 10X30 primary jaw crusher. After reduction through an 8-in. setting, the primary crusher product is received on a 24-in. belt for transfer to a dry primary screen. The bottom-deck fraction from the scalper by-passes the crusher, and joins the discharge from the latter on the same belt.

Feed passing the lower deck is received on an 18-in. belt paralleling the 24-in. conveyor, and is transported to a wet primary screen. This 4- by 12-ft. double-deck unit is equipped with spray bars, and is fitted with screencloth to make a ½-in. separation on the top deck, followed by a 3/16-in. split on the bottom deck.

The top-deck retained fraction is chuted into one of the two compartments in an underlying 60-ton Butler bin. Material may be bled from this compartment to a conveyor feeding the final screen, described later, and is also drawn upon as feed for one of the two secondary crushers—in this case a 2-ft. Symons cone driven by a 40-hp. motor. Crusher discharge is transferred on a short 18-in. belt to the final screen feed conveyor.

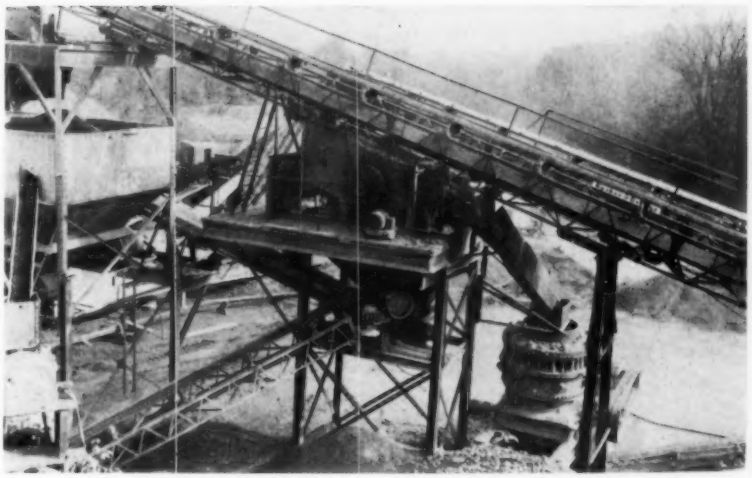
Plus 3/16-in. material retained on the lower deck of the wet primary screen is placed *via* flopgate either in the bin compartment noted above to join the top deck fraction, or in the adjoining 30-ton compartment for separate handling.

An unusual installation is provided for handling the bottom deck throughs. Wash water and sand passing through the first washing section

This view of the primary crushing installation shows the dump hopper, the scalper, the primary jaw crusher, and the two conveyors leading to the wet and dry primary screens. Round material only is carried on the belt on the conveyor at left.

Pit-run material (minus 10-in.) retained on the upper deck of the scalper flows to the jaw, while that retained on the lower joins the crusher discharge on the uppermost belt in this view. Bottom-deck throughs are received on the lower belt.

The dry primary screen is supplied by the far belt, and oversize is chuted to the larger of the two secondary crushers, bottom right.



of the bottom deck flow to an "elephant trunk" flume, while that passing the second wash area flows into the hopper below the screen.

The latter discharges into a flume leading to the drag classifier, in which mason sand is processed. The "elephant trunk," however, may be swung to discharge into a flume leading to the twin-screw classifier (if the material is coarse) or to the flume supplying the drag (if the material is relatively fine); or it may be positioned to split the feed to both classifiers in any desired amount of flow to either unit.

Concrete sand discharged from the twin screw classifier is stockpiled *via* an 18-in. stationary stacker conveyor. Products of the drag classifier are similarly handled in transfer to an adjoining stockpile.

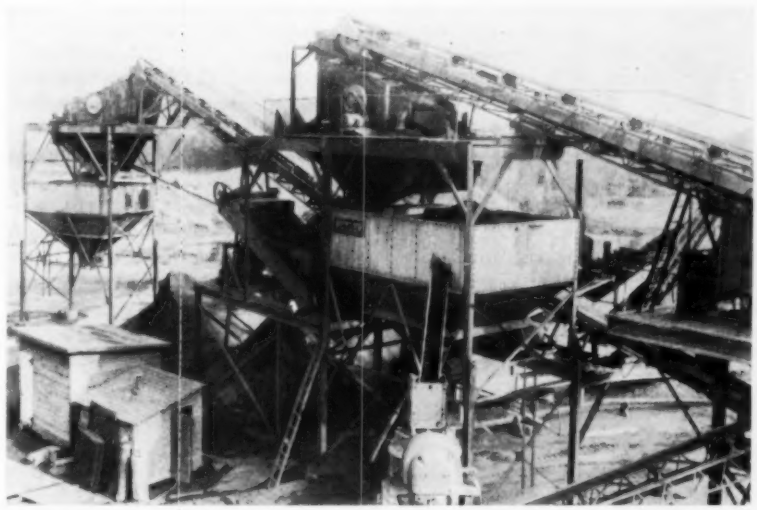
The dry primary screen noted previously, which is fed the products of primary reduction, is a 4- by 10-ft. double-deck unit. Only one deck is normally used, however, and it is fitted with 1⅛- by 1-in. opening screencloth.

Oversize retained is chuted to the larger of the two secondary crushers, a 36FC Gyrasphere driven by a 75-hp. motor. Crusher discharge is received on an 18-in. return belt and transferred to the conveyor feeding the dry screen in closing this circuit.

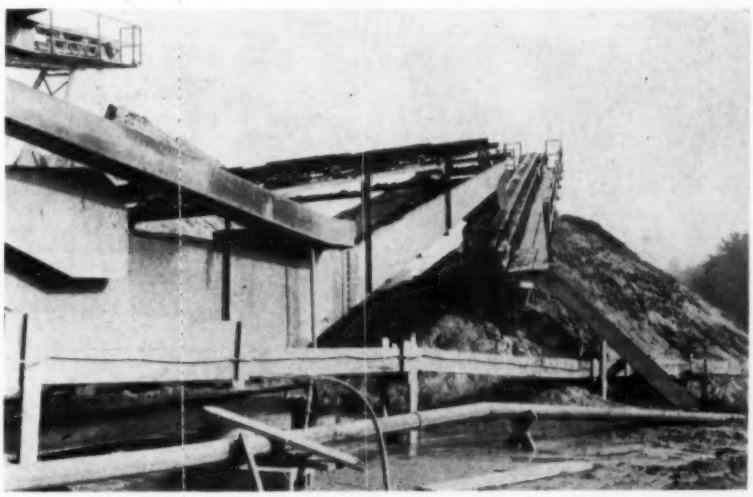
Material passing the above screen is chuted to a 24-in. belt for transport to the final screen. The latter is a 4- by 12-ft. triple-deck unit mounted above another 2-compartment, 60-ton Butler bin, and is equipped with spray bars for final rinsing.

Normally, screencloth of 1¼-, ½-, and 3/16-in. openings is used on the top, middle, and bottom decks, respectively, with the top deck acting primarily as a wear deck. Those frac-

(Concluded on page 175)



At the top center is the wet primary screen, which is fed the scalper's bottom-deck throughs. Other components in this view are the screw classifier, left of the center bin; the final screen, far left; and the smaller scondary crusher, bottom center.



Mason sand is processed in the drag classifier, which receives throughs from the second washing area of the wet primary screen's bottom deck.

Fluorspar in South Africa

By PETER HOLZ

THE Union of South Africa is rich in many minerals, both precious and base. Among the latter is fluorspar, of which about 6,000 tons are produced monthly. For the present at any rate, the country is well endowed with supplies of metallurgical-grade fluorspar, which is used in crude lump form as a fluxing material in the steel and foundry industries.

Production of this type of spar has proceeded in the Ottoshoop and Waterberg areas of the Transvaal for many years; and more recently a remarkable deposit of good metallurgical ore in the Pienaars River area has yielded considerable tonnages for local use and for export. For the purpose mentioned, spar containing 80 to 90 percent calcium fluoride (CaF_2) and a maximum of 5 to 6 percent silica is suitable; the presence of 2 to 3 percent of iron oxide or calcium carbonate is unimportant.

One of the four quarries at the Buffalo Fluorspar Mine. As mined, by open cut, the ore contains 40 to 45 percent calcium fluoride, and after blasting and loading it is transferred in 8- and 10-ton haulage units about one-half mile to the mill.

For the glass and ceramic industries, which have been established in the Union comparatively recently, and in which fluorspar is an important raw material, a higher and more uniform grade is required. For these purposes spar containing 96 to 98 percent calcium fluoride and maximum of 2 to 3 percent silica and 0.2 percent iron oxide is necessary. This is used in powdered form. The standard marketing specifications for acid-grade spar are more rigid—normally the minimum 97 percent of CaF_2, with the maximum of 1 percent each of silica and calcium carbonate. This is used principally for the manufacture of hydrofluoric acid (an essential requirement in the production of aluminum) and certain fluorine chemicals—among others, the refrigerant freon. The tendency during the last few years has been for users to lay down an even higher specification for these purposes. Some overseas buyers demand 98 percent minimum CaF_2 and 0.5 percent maximum silica.

Only limited supplies of high-grade materials have been available in the Union through rather spasmodic production from small "vein type" deposits in the Warmbaths area and in the western Transvaal. Several occurences of this type have also been worked intermittently in Zululand for some years. These are now being opened up more actively,

Production from this S. African quarry is not only consumed locally, but also overseas, where regular and expanding markets have been established

and should provide a possible source of supply for ceramic- and acid-grade spar. Most of these deposits, however, are rather remote from the local consuming centers, and at a considerable distance from rail points. In the past some difficulty has been experienced in maintaining the required maximum of 1 percent silica in bulk export shipments.

An interesting development has therefore been the establishment of a plant for the production of acid-grade spar by the flotation process. This installation was developed at the Buffalo Fluorspar Mine near Naboomspruit in the Transvaal, some 160 miles north of Johannesburg. Most of the acid-grade spar consumed in overseas countries during the last 20 years has been in the form of flotation concentrates.

This undertaking was continued after prospecting and development operations extending over a few years had established the existence of very large tonnages of low-grade fluorspar in the form of a "stockwork" in the Waterberg granites on the farm Buffelsfontein 969.

Mining here is by open-cast methods, and the ore is delivered to the milling and flotation plant at low cost. As mined or quarried, the ore contains an average of 40 to 45 percent of calcium fluoride. The impurities consist essentially of silica and alumina and limited amounts of calcium carbonate, iron oxide, etc.

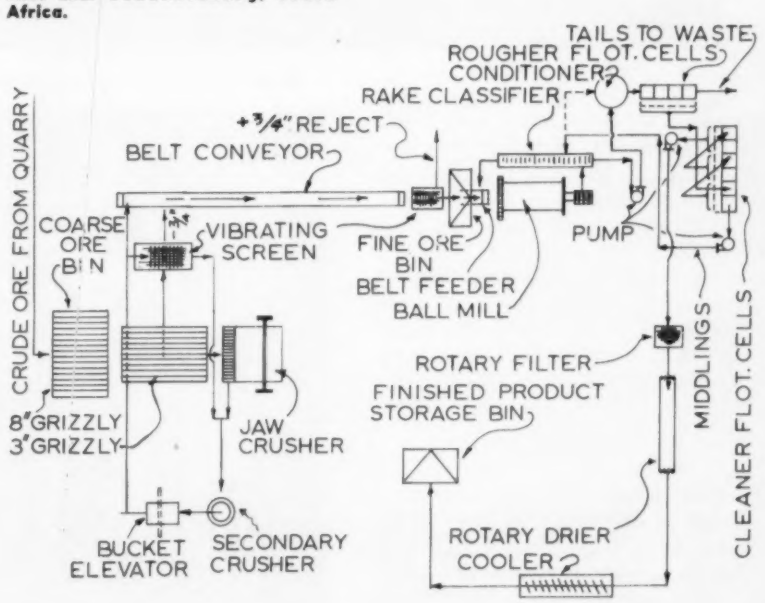
There are four quarries on the property, but only one is being worked. Blast holes are drilled with South African made Delfos RH 67 compressed air drills, 4-ft. 6-in. deep holes being drilled for each blast. The quarry is usually blasted twice a week.

Explosives are from African Explosives & Chemical Industries Ltd., which has a large plant in the vicinity of Johannesburg. Dynamite sticks (8- by 1-in., 60 percent) are used in conjunction with gelignite primers and safety fuse. 95 percent of the broken rock is milling ore.

After drilling and blasting, the ore is loaded into 8- to 10-ton trucks and transported directly to the coarse ore bin at the mill, one-half mile away, or into cocopans and

Blastholes are drilled as shown here to a depth of about 4½ ft., and charged with 60 percent dynamite.

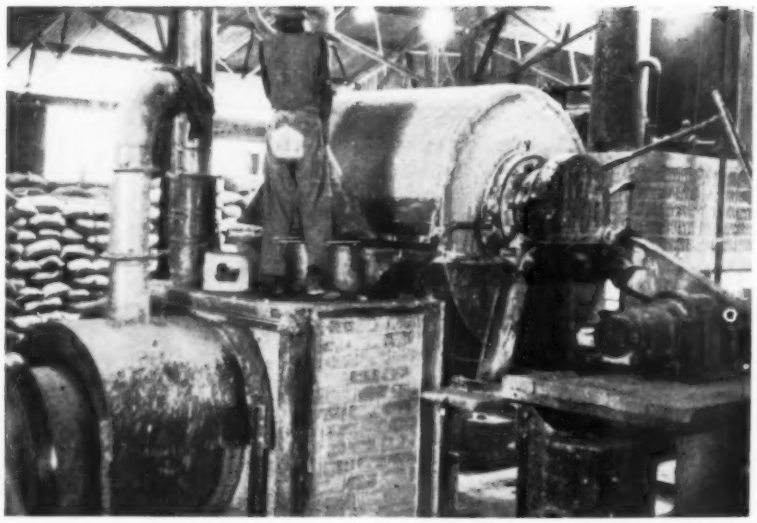
• Flowsheet of Buffalo fluorspar mine near Johannesburg, South Africa.



Above, left: The ore is reduced to minus 1/2-in. size in this primary and secondary crushing installation before it is transported to the wet-grind department.

Above, right: A view of the Buffalo mill building, showing the feed conveyor bringing crusher-run material from the primary and secondary reduction stages.

Above: At left center is the ball mill in which the feed is wet-ground to 100 mesh. Adjacent to the mill, at right center, is the rake classifier in the milling circuit.



Right: Following several rougher and cleaning flotation stages, the final flotation concentrate is delivered to this drum filter, and the resultant cake is transferred to a rotary dryer.

dumped into stockpiles of mined ore.

After being crushed to minus ½ in. the ore is wet-ground to 100-mesh and pumped into a conditioner. Here reagents are added and thoroughly mixed with the pulp, which then passes on through roughing and several cleaning stages of flotation. Thereafter the final flotation concentrate is filtered and dried to reduce moisture content to about 0.1 percent. The final product analyzes 96.5 to 97.8 CaF_2, 0.3 to 0.7 percent silica, 0.4 percent $CaCO_3$, 1.5 percent Al_2O_3, and about 0.1 percent Fe_2O_3. While this analysis is satisfactory, it is anticipated that certain additions and modifications to the plant now being provided will further improve the grade of concentrates.

Initially, power for the undertaking was provided by a 240-kw. diesel generator set. However, a high-tension (66-kv.) overhead powerline from the steam generating plant at the Warmbaths Municipality, some 65 miles distant, completed two and a half years ago, provides better continuity of operations at considerably lower cost. Water is obtained from a project completed by the Naboomspruit Village Council during 1956, and from streams and dams on the property.

The mine presently employs six to eight Europeans and 70 to 80 natives, for whom housing is largely available on the property.

The production from this well-established undertaking has assured supplies of "acid" and "ceramic" grades of spar for local industry; and as a result of careful and extended tests overseas, regular and expanding markets are being established in Australia, the United Kingdom, Japan, and Sweden. The finished bagged product is taken by trucks from the mine to a railway station about six miles away.

In the existing plant 75 tons of ore can be processed per 24 hours, yielding an output of 400 to 450 tons of concentrates per month. This quantity has been adequate to cover local requirements, plus export contracts now on hand, but in anticipation of increasing demands from overseas, work will be started soon on extensions which have been under consideration for some time.

While fluorspar is stated to be one of the minerals readily amenable to flotation, it has been found that with rigid specifications and the small margin of error allowed by consumers, close control of operations at all stages in the milling and concentrating plant is essential.

A bag of finished product is sewed closed by one of the mill crew. Bags of concentrate are trucked to a rail loading point a few miles from the mill.

Eastern Road Builder Adds Aggregate Plant

(Continued from page 171)

tions retained on the upper two decks are chuted into the appropriate compartment, and that retained on the bottom deck passes to the other bin section.

John Guzey, left, president of the Keystone organization; with Alvie Frisbie, center, foreman; and Orville Tosti, right, superintendent.

The minus 3/16-in. fraction passing the bottom deck is flumed to the sand drag. About 600 g.p.m. of water are pumped from a well to the above final screen, the wet primary screen, and the two classifiers.

Under the direction of Orville Tosti, plant superintendent, and Alvie Frisbie, foreman, production in this interesting young operation is handled by a crew of only 5 men. The plant itself requires the attention of only one man—the balance of the crew is made up of the shovel runner and three pit-truck drivers.

The progressive Keystone organization is headed by John Guzey, president, who has enhanced the firm's existing sound record in road construction with an efficient aggregate production facility to support that activity.

Gypsum, Anhydrite Bibliography Notes Reports on 400 Deposits

Geological Survey Bulletin 1105, entitled *Selected Annotated Bibliography of Gypsum and Anhydrite in the United States and Puerto Rico*, has been published by the U. S. Department of the Interior. Data in the bulletin was compiled by Charles F. Withington and Marion C. Jester.

This 126-page bibliography contains more than 400 annotated references to literature available in the libraries of the U. S. Geological Survey and the Department of the Interior in Washington, D. C. Available from the U. S. Government Printing Office, Washington 25, D. C.; price, 50 cents per copy.

A new processing plant, Mid-South Limestone Bi-Products, Inc., will soon begin operations at Imboden, Ark. Output is rated at up to 40 t.p.h. of agricultural limestone.

North Dakota contractor uses jigs to produce

Specification Aggregates from Non-Specification Pit

THE Schultz & Lindsay Construction Company of Fargo, N. D., through the use of jigs was able to make specification aggregates from a non-specification pit near their highway paving project. The pit, located ten miles from the construction site of Interstate Highway No. 10, reduced hauling cost and allowed close control of aggregate production for use on the highway project near Medina, N. D.

Because of high shale content, the pit did not meet the specifications of the state of North Dakota for concrete aggregate. With the use of selective mining to circumvent heavy iron pockets, and the installation of Wemco Remer jigs in the wash plant to eliminate shale and other lightweight deleterious material, the aggregate is upgraded to state specifications. The sand jigs were treating a ⅜-in. to 100-mesh material containing an average of 2 to 4 percent shale and soft rock. This was reduced by treatment to between 0.5 and 0.8 percent. The maximum allowable deleterious material in sand in North Dakota is 2.0 percent. The rock jigs were treating a 1½- to ¼-in. material averaging 2 to 3 percent shale and iron oxide. Treatment by the jigs reduced this to consistently below the permissible 2.0 percent maximum.

The plant, located near a small lake which provides an adequate water supply, can best be described as being divided into three sections—for crushing, washing, and jigging.

Crushing—A 605 Koehring dragline loads the trucks which haul the pit-run gravel to a plant feed surge pile. The pit-run material is carried from the surge pile by belt conveyor to a Cedarapids Commander portable crushing plant. Feed to the crushing plant is approximately 200 to 250 t.p.h. The crusher reduces the coarse material to 1½-in. top size and a belt conveyor carries it up to the wash section.

Washing—The wash section is comprised of a 4- by 12-ft. double-deck Cedarapids horizontal vibrating screen equipped with spray bars. The prime purpose of the wash screen is to separate the coarse and fine aggregates for feed to their respective jig sections. The underside of the screen is equipped with a flop gate to control the amount of ¼-in. by 0 sand to be fed to the sand jig section. The ¼-in. by 1½-in. coarse aggregate, washed free of fines, is carried by conveyor belt to the coarse jig section.

Jigging—In the coarse (rock) section the conveyor from the wash screen carries the 120 to 150 t.p.h. of ¼- by 1½-in. rock to a surge bin. The three 5- by 16-ft. rock jigs are aligned side by side under the surge bin, which is equipped with three outlet gates, one in the center and one on each side. Two short feeder belts feed the two outside jigs from the two side gates of the surge bins, and the center jig is fed direct from the center outlet. The surge bin also furnishes the uniform, constant feed required to each rock jig.

There are three products from the jigs: the lightweight deleterious material which is flumed to waste, the No. 4 hutch product which is flumed to a pump sump in the wash section; and the ¼- by 1½-in. coarse aggregate. The rock, devoid of deleterious material, is flumed to a 3- by 10-ft. double-deck Pioneer vibrating screen. The ¾- by 1¼-in. rock is screened off on the top deck and flumed to an 18-in. Eagle Iron Works

The Schultz and Lindsay Construction Company's plant near Medina, N. D. The sand plant (foreground) is shown with the jigs on the top level and the sand sorter below. Jigs for treating gravel are in the second tower.

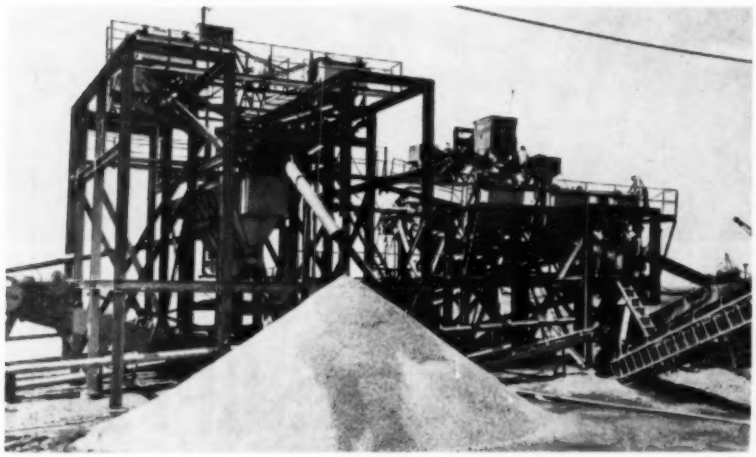
coarse screw washer to eliminate any minus 200-mesh fines cemented to the rock. It is then carried by belt conveyor to stockpile. The bottom deck has a ⅜-in. opening. The ⅜- by ¾-in. rock is carried by belt conveyor to the ¾- by ¼-in. stockpile. Minus ⅜- by ¼-in. underflow from the bottom deck flumes to the pump sump located under the wash screen.

Minus ⅜- by ¼-in. rock and minus ¼-in. sand that is collected in the pump sump is pumped up to an elevation of 30 ft. to a splitter box at the head end of two 5- by 16-ft. Wemco sand jigs. The 5-in. Wemco sand pump handles approximately 80 t.p.h. of minus ⅜-in. material and 500 g.p.m. of water. Two pipes from each side of the splitter box feed each sand jig. There are three products from this jig section: lightweight deleterious material (shale and light irons) flume to waste; ⅜-in. by No. 4 coarse material flumes to a single-deck 4- by 6-ft. Pioneer vibrating screen for dewatering and separation of minus No. 4 sand that has carried over; ⅜- by ¼-in. rock is carried *via* belt conveyor to the ¾- by ¼-in. stockpile conveyor and hence to stockpile.

Minus No. 4 sand from the jigs, along with the minus ¼-in. from the 4- by 6-ft. screen, is flumed to a No. 20 Wemco Sand-Sort, which scalps off excess water and any remaining slimes.

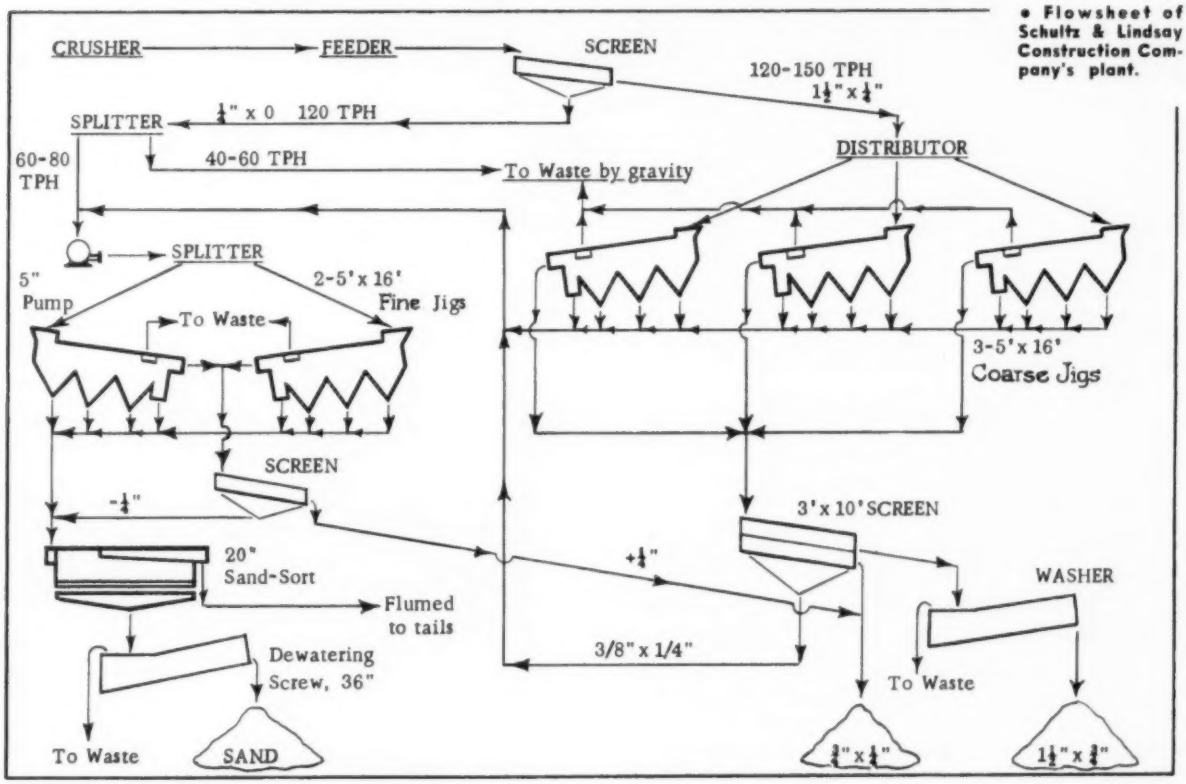
The Sand-Sort is also used to keep the sand product within fineness modulus specifications. If at any time an excess shows up in a mesh range that would upset this fineness modulus, this excess can be separated out in the Sand-Sort. The sand product from the Sand-Sort is flumed to a 36-in. Eagle fine material screw and hence on to a conveyor to stockpile.

Material from all the stockpiles is loaded into 18-20 yd. bottom-dump semi-trailers which haul the



Left: There are three products from the jigs in the sand section, left, and three from the jigs in the coarse section, right.

• Flowsheet of Schultz & Lindsay Construction Company's plant.

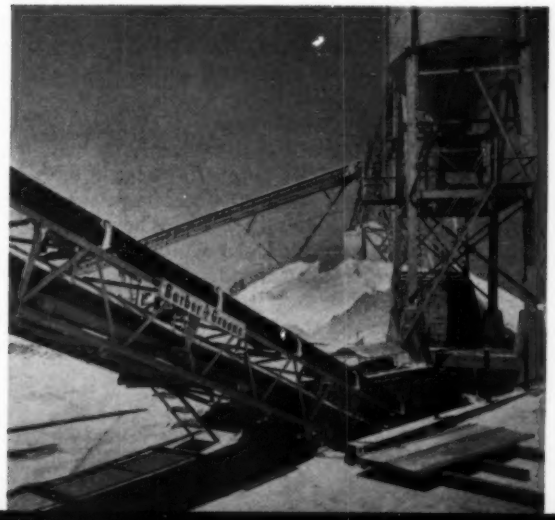


CONVEYOR SYSTEM SUPPLIES AGGREGATES TO READY-MIX, BLOCK AND PIPE PLANTS

Overall view of Pinellas Industries, Inc. three plants, all served by a one-man-operated Barber-Greene conveyor system. Seven year production: 33,600,000 concrete blocks, 103,000 concrete pipe joints ranging from 12-60" inside dia. and 346,400 yards of ready-mix for an all-truck fleet.

Aggregate classification and stockpiling is neatly handled by this 93' reversible Barber-Greene shuttle conveyor above four storage areas. Shuttle also feeds belt conveyor charging new ready-mix plant directly.

Closeup of conveyor that reclaims from stockpiles and charges central control turnhead atop batching plant.



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New 44-page Idler Bulletin describes the more than 800 units available in the complete Barber-Greene line, tells how their years-ahead features bring longer life and greater economy to every job. Ask for your copy today.

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• ASPHALT PAVING EQUIPMENT

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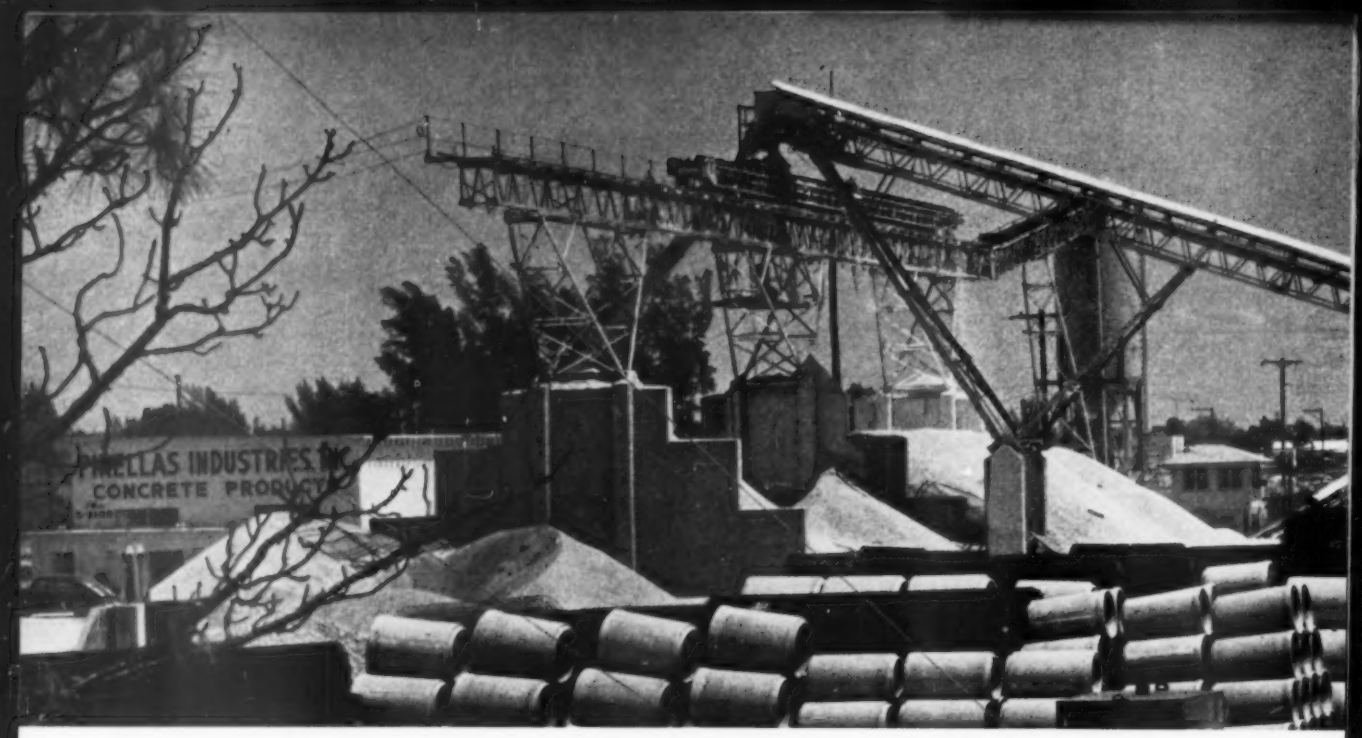

CONVEYOR SYSTEM SUPPLIES AGGREGATES TO READY-MIX, BLOCK AND PIPE PLANTS

This efficient, economical 5-unit Barber-Greene belt conveyor system supplies all aggregates to the concrete block pipe and ready-mix operations of Pinellas Industries, Inc., St. Petersburg, Florida.

"Our Barber-Greene conveyors have given us seven years of dependable operation, handling 15,000 tons of aggregate monthly for a total of 1,260,000 tons," reports Terry B. Peacock, vice-president and general manager.

"Maintenance per ton handled has been very low . . . no carrier replacements," he adds.

All conveyors have 24″ belts, total 929′ in length and have a 300 tph capacity.

The several sizes and types of aggregate required arrive in bottom dump rail cars. Stockpiling flow pattern: From cars into track hopper which discharges onto 193′ inclined conveyor leading to reversible shuttle conveyor high above four stockpiles that are kept free of contamination by bulkheads. Shuttle conveyor also charges ready-mix plant directly.

Reclamation of aggregates as needed is by tunnel-housed 295′ conveyor located beneath stockpiles. Hand-operated clamshell gates drop material onto conveyor which discharges onto 285′ inclined conveyor leading to central control turnhead atop batching plant. Use of bypass chute fitted to turnhead assembly permits discharging aggregate onto 63′ conveyor supplying pipe plant.

Get this same lowest-per-ton-cost material handling efficiency for your pit, quarry or concrete products plant by calling your Barber-Greene Conveyor Specialist. His Standardized Conveyors, made of pre-engineered and pre-aligned components, plus Barber-Greene's 40 years of design experience can lower your original investment and your maintenance costs.

Overall view of Pinellas Industries, Inc. three plants, all served by a one-man-operated Barber-Greene conveyor system. Seven year production: 33,600,000 concrete blocks, 103,000 concrete pipe joints ranging from 12-60" inside dia. and 346,400 yards of ready-mix for an all-truck fleet.

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aggregates to the cement batching plant at the highway project. Here the material is dumped in separate stockpiles and conveyed to the batcher.

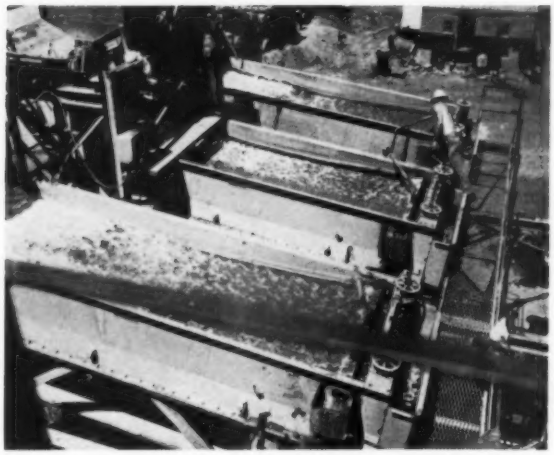
All phases of production are kept under close control. Test facilities are maintained at the plant site to check the aggregate, to make sure it meets specifications.

Power for the plant is furnished by a portable electric generator, with all controls, enclosed in a semi-trailer.

The plant requires approximately 3,000 g.p.m. of water at 20-25 p.s.i., which is furnished by an 8-in. Gorman-Rupp centrifugal pump installed on the shore of the lake 150 yd. from the plant.

Jack Schultz & Jack Lindsay are partners in the Schultz & Lindsay Construction Company, which has done extensive road building and bridge building in North Dakota. George (Bud) Wilson is the general superintendent of this firm, and the plant superintendent is Harold Bushing.

The jig section structure was designed by Western-Knapp Engineering Company, Hibbing, Minn. The flowsheet was recommended by Wemco engineers. All other phases of the plant, such as conveyors and crushing facilities, and the feed section to the rock jigs, were designed by Jack Lindsay. Plant erection and construction was supervised by Bud Wilson and Harold Bushing.



Right: Three jigs, operating in parallel, eliminate the shale from the coarse material.

Stockpiled materials are loaded into bottom-dump trailers for haul to the batching plant at the highway project.

Eight New Sales Appointments In Consumer Div. of Vulcan

Subsequent to a major reorganization of the executive staff of Vulcan Materials Company's Consumer Division (see PIT AND QUARRY, March, 1960, p. 40), D. B. Wendling, vice-president of the division, has announced eight new appointments as part of a complete reorganization of the sales department.

Ray Dalton has been named sales manager of the industrial department. Bruce Schlegel is the new general sales manager of the building materials department. William E. Nelson is sales manager for the newly-formed public works department. James J. Rice has been named sales manager of the slag department.

Henry Ludwig has been appointed building materials sales manager in the building materials department. Three district sales managers have been appointed to co-ordinate activities with the central office: Herbert Edmunds supervises the central district, T. K. Douglas, the north district, and George Webber the south district.

Plans have been announced for the modernization and expansion of the Seattle, Wash., office building of Permanente Cement Company. The addition of a second story will add about 6,000 sq. ft., doubling the existing space. Glacier Sand & Gravel Company, a Permanente subsidiary, will also occupy the building.

Seventh Lake Carrier Added By Huron Portland Cement

Purchase of the vessel *Amoco* from the American Oil Company was announced recently by Charles M. Adams, vice-president in charge of operations of Huron Portland Cement Company. It will be the seventh boat in the Huron fleet and will be renamed the *H. R. Schemm*, in honor of Huron's president.

Extensive revisions of the hull and superstructure will precede the *Amoco's* entrance into Huron service, probably in 1963. When these are completed, she will be equipped to carry cement and coal. The *Amoco* is 500 ft. long, with a 68-ft. beam and a depth of 37 ft. Her carrying capacity will be approximately 53,000 bbl. of cement.

New Crushed Stone Facility Opened Near Pacific Missile Range

Affiliate produces natural sand

By HARRY F. UTLEY

MISSILE City Rock Company recently placed in operation a new commercial crushed-stone plant near Lompoc, Calif. This is the first permanent installation of its kind to go into production along the 500-mile stretch of coastal California between Watsonville, south of San Francisco, and San Diego. An affiliated company produces natural sand for blending with the stone screening.

For years, Lompoc had been known chiefly as the flower-seed capital of the world. Lately, however, the character of this small city has been transformed as it became the focal center of the Pacific Missile Range. Vandenberg Air Force Base, home of the Thor, Titan, and Atlas missile-launching systems, and the Navy's Point Arguello Missile Facility have churned the area into one of teeming activity.

Demand for high-type aggregates for roads, launching pads, and scores of other construction needs prompted the erection of the new crushed-stone plant — largely because native gravels in that area are of poor quality and more or less reactive.

The Missile City deposit is located on a 5-mile ridge of dolomitic marble between Lompoc and the coast. The new processing plant has an initial capacity of 250 t.p.h. of minus 1⅛-in. finished product. The "open-end" design of the all-steel and concrete plant will allow capacity to be doubled when the time comes, with little (or no) alterations, since the structures and foundations are prepared to accommodate the additional (or larger) equipment.

Another interesting angle is the use of equipment, such as the screens, of identical size for interchangeability. Eight belt-conveyors are likewise equipped with Schrock motorized head-pulleys, all of identical size, 7½ hp.

The quarry up on the ridge is being worked to develop a system of benches. Drilling is done with an Ingersoll-Rand crawler-mounted machine supplied with air from a 600-c.f.m. Gardner-Denver compressor. The 3½-in. holes are being put down 20 ft. in an 8- by 8-ft. pattern, loaded with Hercules Dynatex ammonium-nitrate explosives, and detonated with non-delay Primacord. Weekly blasts currently fragment about 15,000 tons of stone, which is dozed downhill into surge piles. Yield is estimated at about 2¼ tons of stone per pound of explosive.

A shovel, trucks, and a Scoopmobile load from the piles and deliver to a 30-ton hopper which supplies the plant equipment. Below the hopper a Kennedy apron-feeder feeds to a Simplicity double-deck vibrating grizzly. Here the minus ⅞-in. throughs, including overburden which is not stripped prior to quarrying, are wasted.

Plus 5-in. stone on the top deck passes to a 30- by 42-in. Pioneer jaw crusher set at 5 in.; stone in the range of minus 5 in. plus ⅞ in., held on the grizzly's lower deck, joins the primary crusher product on a 36-in. belt conveyor. This

This view at the plant of the Missile City Rock Company shows a truck discharging into the hopper ahead of the primary crusher. A part of the plant is visible at the lower elevation.

conveyor builds a surge pile of 5,000 tons live storage capacity. The crusher is mounted on an I-beam frame base to facilitate installation of a larger breaker if and when plant capacity is increased.

A Syntron feeder in the tunnel beneath the surge pile puts the stone on a 36-in. by 250-ft. belt conveyor for delivery to the top of the 85-ft. high screening tower. The conveyor structure, after leaving the tunnel, is composed of a single 120-ft. unsupported truss section. All conveyors use Quaker-Pioneer belting and Stephens-Adamson rolls and idlers.

The first of three 5- by 14-ft. Simplicity double-deck screens serves as a scalper. Plus 2½-in. top-deck rejects pass to a 4½-ft. Symons standard cone crusher, and plus 1⅝-in. stone retained on the lower deck go to a 4-ft. Symons shorthead cone. The crushers are mounted side by side at ground level and are fed *via* rock boxes and closed chutes. The standard and shorthead crushers are set at ⅞ and ½ in., respectively. A common 24-in. belt carries away total product, transferring to another belt conveyor for return to the scalping screen, thus closing the circuit.

The second screen in the series, equipped with 1⅛- and ⅞-in. mesh, accepts the throughs from the scalper. The third screen carries $\frac{7}{16}$-in. and No. 4 mesh cloth. The two units accomplish the job of finished sizing, making the following blends: 1½ to 1 in.; 1 in. to No. 4; and minus No. 4 fines. As previously mentioned, floor space has been provided in the screening tower for installing additional screens when needed, and headroom on the different levels is more than adequate.

Finished products are ground-stored by stacker conveyors. Initially, delivery trucks are being loaded by a 3½-cu. yd. Scoopmobile from the stockpiles, but it is planned a little later on to install reclaimer loading belts in tunnels under the piles.

The crushed material has been accepted by all federal and state agencies. Specific gravity of the product is 2.72 minimum, and the weight is about 180 lb. per cu. ft. This material is, of course, entirely non-reactive with all types of cement, when used in concrete. However, pioneering crushed-stone aggregates in an area where the construction industry has had prior experience only with stream-bed materials, is requiring some educational effort on the part of the management.

The difference in concrete workability requires a somewhat different proportioning technique, of course, than that customarily used in that area. In the East, where practically all crushed-stone is produced, more than half the gross output is used in concrete and road work. In California, less than 5 percent has gone into this form of construction.

The excellent stability of asphaltic mixtures using crushed-stone aggregates, and its recognized high affinity for bitumens, makes the sales effort a simple one in this market.

Other prospective product uses for the Missile City plant output include metallurgical flux, roofing granules, poultry grits, refractories, etc.

Straight stone-sand is not being actively promoted as concrete sand by the company. Instead, the concern has set up an affiliate, Missile City Sand Company, to produce native sand. This product is upgraded to specification quality by blending minus No. 4 stone screenings from the quarry plant with minus No. 8 river sand.

The new sand plant is located on

The primary crushing structure, located on a hillside, where the stone is reduced to minus 5 in. before being surge-piled.

This view of the screening tower illustrates how provision has been made for the installation of additional screens, etc., without the need for major structural alterations. Two cone crushers are below the screening tower.

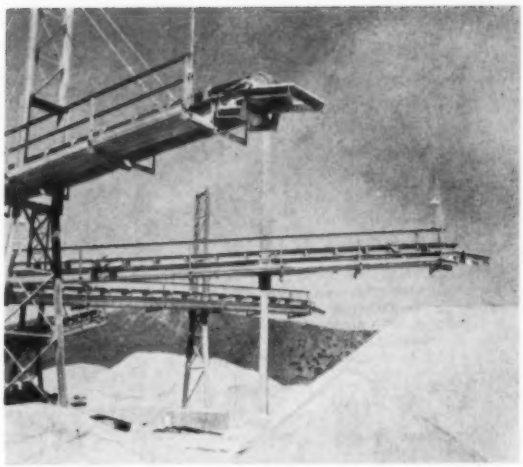
the Santa Ynez River, about 8 miles from the quarry operation. Here again, uniformity and interchangeability of equipment with that used in the quarry plant is carried out. The same size screen, a 5- by 14-ft. Simplicity double-deck unit and 7½-hp. Schrock motorized conveyor pulleys are used.

Screen throughs at the sand plant are processed in an Eagle Iron Works 7-valve water scalper and dewatered in a 54-in. diameter Eagle spiral classifier. Stone sand is blended with the river sand in the pool area of the de-watering spiral, being introduced by a screw conveyor fed by hopper from the stockpile of screenings. A radial conveyor mounted on four pneumatic tires builds up the drainage-storage piles. Besides specification (blended) concrete sand, the plant also turns out plaster and straight river sand.

B. W. Martin of Los Angeles is president of the Missile City Rock Co. and its sand-producing affiliate. W. Neal Richardson is the general manager. Mr. Richardson has long been connected with the aggregates industry. As a consulting engineer with Brown-Bevis-Industrial Equipment Company, Los Angeles, he was largely responsible for the design and erection of the facilities described. After the completion of these installations he resigned from the equipment firm to direct the operations of the facilities he had designed. Previously he had been on the engineering staff of the Iowa Manufacturing Company, and for a time served as sales manager for Universal Engineering Corporation.

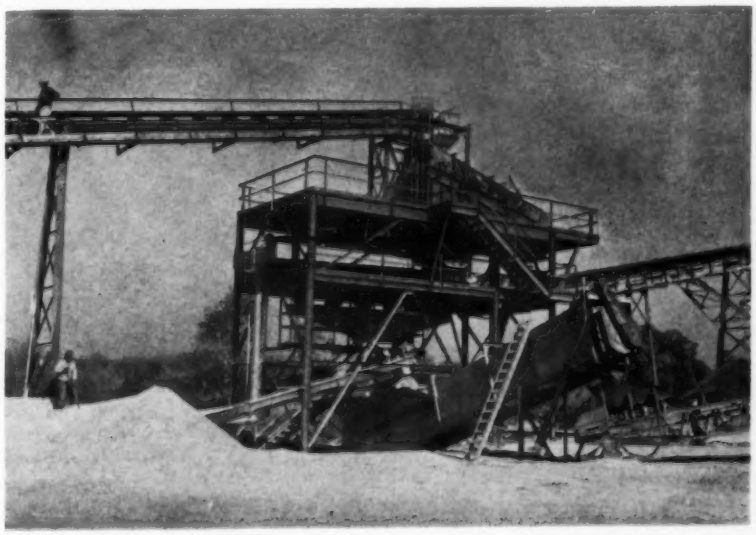
Structural and concrete design for the plants was in the capable hands of the Arthur E. Howland Co., Los Angeles. All equipment was purchased through Brown-Bevis-Industrial.

Right: The stockpiling conveyors at the crushed stone plant. Note the motorized head pulley on each conveyor.



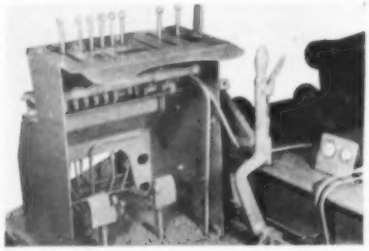
Below: At the left a dump truck is discharging to the sand-plant hopper and the conveyor which carries material to the screening-washing-blending plant.

Below: This view of the sand-processing facilities shows the screw conveyor which carries stone screenings from the pile to the spiral classifier for blending with native sand.

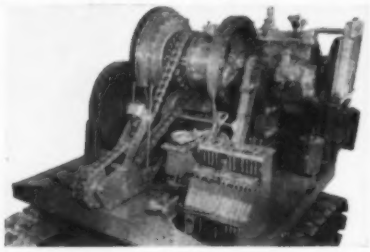


PAUL INGERSOLL, formerly plant superintendent of the Kickapoo Sand and Gravel Corporation, Peru, Ind., (a subsidiary of O'Connor & Sons, Inc.), has been appointed general manager for the firm. RAY TUCKER succeeds Mr. Ingersoll as plant superintendent.

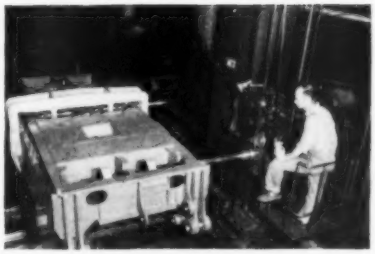
Six reasons why Link-Belt Speeder . . .



1. **SPLIT-SECOND FINGERTIP CONTROL** — Exclusive Speed-o-Matic power hydraulic controls put a K model through its paces at a flick of an operator's wrist . . . minimize fatigue . . . encourage high production throughout the shift.



2. **BONUS USABLE HORSEPOWER** — The extra strength built into load-carrying components permits K models to take full advantage of the engine's available horsepower and still remain well within engine manufacturers' recommended speeds.



3. **PRECISION ALIGNMENT TO CUT MAINTENANCE** — Close-tolerance machining, including jig line boring (above), means closer fits . . . less chance for eventual misalignment . . . no need for shims . . . better parts interchangeability.

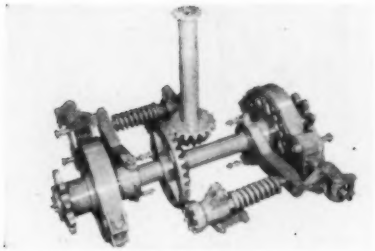
King-size K models

Here's how the 1¾-yard K-370 Series is tailored to today's economy . . . why it's a better buy than any 1½-yard shovel-crane . . . more practical to use than many 2-yard rigs

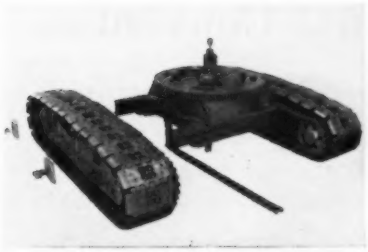
In comparison with 1½-yard machines, the 1¾-yard K-370 offers much more than just a 16% advantage in bucket capacity. It's fast, easier handling . . . exceptionally maneuverable and easy to transport. It boasts the top usable horsepower in its class . . . even outrates some 2-yard rigs.

For the complete story, see your distributor or write for the new 20-page catalog, No. 2727.

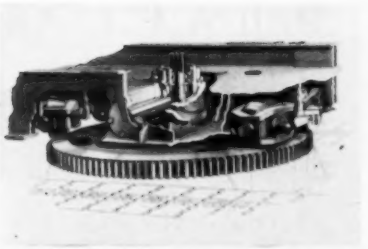
LINK-BELT SPEEDER CORP., CEDAR RAPIDS, IA.



4. EXCEPTIONAL ON-THE-JOB MANEUVERABILITY—Traction mechanism features hydraulic power steer. This, plus high speed power shifting, makes K models great for work in tight quarters. No time wasted to manually engage jaw clutches.



5. EASY JOB-TO-JOB TRANSPORTABILITY—Any K model can be readied for lowboy or rail car transport in short order. Crawler side frames, counterweight and attachments can be removed to meet weight or width restrictions.



6. NO BINDING STRESSES ON CENTERPIN OR ROLLERS—Exclusive centerpin trunnion and oscillating conical roller design eliminates concentrated centerpin loadings . . . prevents shearing or bending . . . minimizes wear.

deliver bonus output

And here's why the 3-yard K-608 series outmaneuvers smaller rigs . . . often outproduces bigger machines

The K-608 has created real excitement wherever it has been used. It's so fast, so easy to handle, so powerful!

And no wonder—with Speed-o-Matic controls, power shift, power steer and many other features, the K-608 wheels through cycles at a speed you'd expect only from smaller rigs. The K-608 features an engine-torque converter and tailshaft output governor combination as standard equipment. The result—ability of engine power to adapt to load requirements . . . no chance for engine stalls.

For all the facts, see your distributor or write for the new 20-page catalog, No. 2710. 14,966

LINK-BELT SPEEDER

It's time to compare . . . with a Link-Belt Speeder

Enter 184 on card, page 233

56th A.C.I. Annual Convention

Attracts 1,000—Kelly Elected President

The American Concrete Institute held its 56th Annual Convention at the Commodore Hotel, New York City, March 14 to 17, 1960. With a registration of well over 1,000, the meeting established a new all-time high record in attendance, clearly indicating a continued increasing interest in concrete and concrete construction. A local committee of A.C.I. members from the New York area was host for the meeting.

Joe W. Kelly, professor of civil engineering, University of California, was elected president of A.C.I. for 1960, succeeding Professor Phil M. Ferguson, University of Texas, who completed his one-year term in that office.

Other newly elected officers include the following: Raymond C. Reese, consulting engineer, Toledo, Ohio, vice-president for a two-year term; and as members of the board of directors—A. Allan Bates, Portland Cement Association, Chicago, Ill.; Bruce E. Foster, National Bureau of Standards, Washington, D. C.; Ben C. Gerwick Jr., San Francisco, Calif.; and Professor James A. McCarthy, University of Notre Dame, South Bend, Ind.

Lewis H. Tuthill, California State Department of Water Resources, Sacramento, will continue as vice-president for a second year.

Honorary A.C.I. membership was conferred on Professor Charles H. Scholer, Manhattan, Kans., and William Lerch, Chicago, Ill., for their outstanding contributions to A.C.I. and the concrete industry, especially in the field of research.

Twenty-eight committees held meetings to discuss the various aspects of concrete and concrete construction. There was one general session and six technical sessions, the annual awards luncheon, and an open research session that provided discussion of research projects under way but not yet released for publication.

President Ferguson described the world-wide interest in the activities of A.C.I. and discussed three items that deserve major emphasis in the future—(1) better control of the quality of materials and concrete mixtures to provide a more uniform product; (2) the need for more extensive inspection and more rigid inspection; and (3) the need for more intensive research. He suggested that industry should provide financial support for research at universities.

Phil M. Ferguson, Austin, Tex., retiring A.C.I. president (left), congratulates Joe W. Kelly, Berkeley, Calif., the newly elected president.

William Lerch, Chicago (left), and Professor Charles H. Scholer, Manhattan, Kans., both newly elected honorary members of A.C.I.

F. E. Legg Jr. and W. W. McLaughlin described *Gravel Beneficiation in Michigan.* Fourteen plants were in operation in that state in 1959. By the selection of a suitable process and proper plant operation, inferior aggregates can be improved to meet the requirements of specifications. Messrs. Legg and McLaughlin did not express a preference for any one process. They believe that the process to be used should be selected on the basis of the materials to be processed. That should be determined by preliminary trial prior to constructing a processing plant.

The session on materials covered consolidation of concrete, durability of lightweight aggregate concrete, maximum size of coarse aggregates, and portland blast-furnace slag cement.

R. W. Fisher Jr. Named V.P. Of Kaiser Overseas Engineers

R. W. Fisher Jr., formerly principal engineer with Kaiser Engineers, has been elected a vice-president of Kaiser Engineers Overseas Corp.

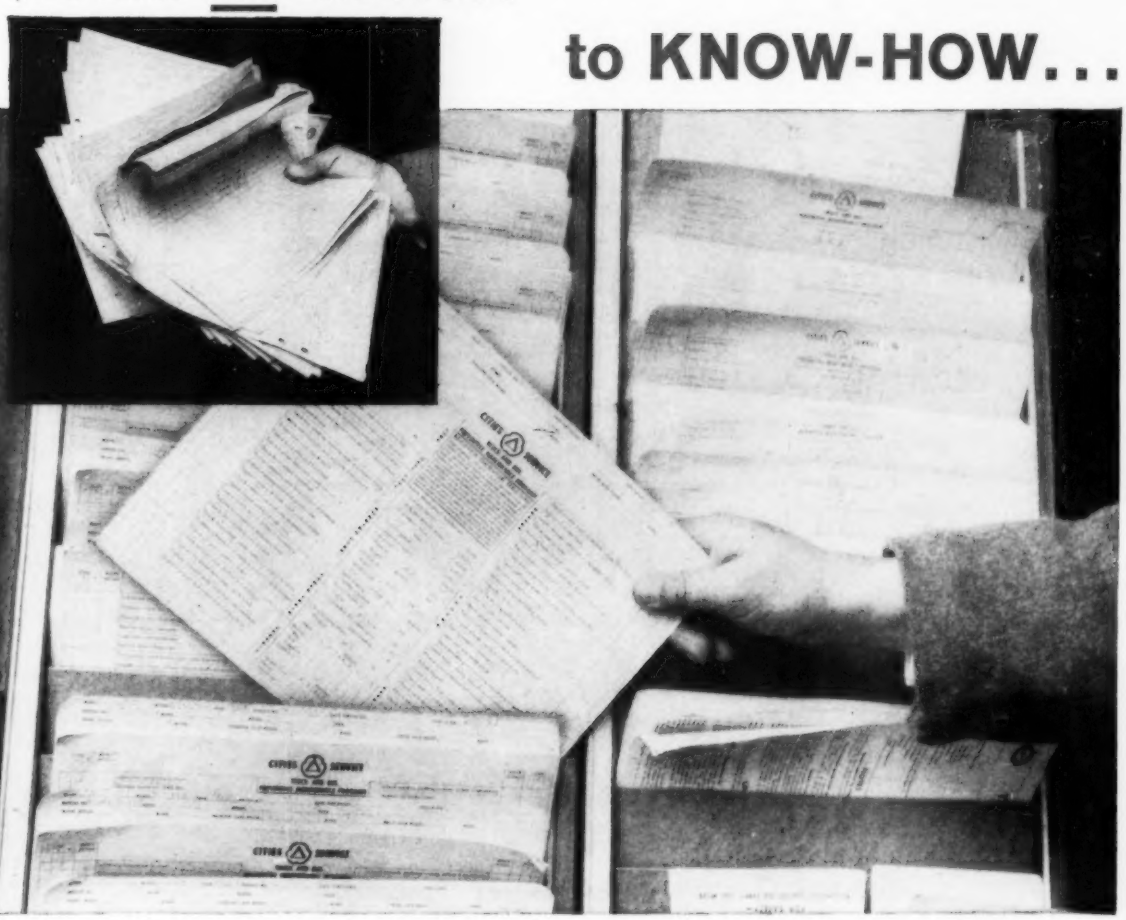
Mr. Fisher's first assignment is that of project manager of a 100,000-ton-per-year portland cement plant being designed and constructed for Mysore Cements Ltd., at Ammasandra, Mysore State, India. He will take up residence in Bangalore, India, about 80 miles from the site of the new plant.

Included in this project are the supervision of quarry development, road and rail facilities, raw material storage, cement storage silos, a laboratory, and the processing plant itself. The entire project is scheduled for completion by mid-1961.

Minco Mining Company, Albuquerque, N. M., will construct a perlite crushing and processing plant west of Deming, N. M. Grinding capacity will be approximately 250 t.p.d. of ore. Primary markets will be in Texas and the southeastern states.

R. B. STAUBER has been named plant manager for Crystal Silica Company, Oceanside, Calif., a wholly-owned subsidiary of Ottawa Silica Company, Ottawa, Ill.

From no how...



to KNOW-HOW...

with Cities Service
PREVENTIVE MAINTENANCE PROGRAM

No how—that's the only way to describe the preventive maintenance program previously used by the Western Sand and Gravel Co. of Spring Valley, Ill. *No how* was it possible to get order or efficiency from the program shown in the first picture above.

RESULT: Uneconomic and inefficient maintenance of the company's twelve ready-mix trucks and five large dump trucks.

KNOW-HOW—that's the ideal description for the Cities Service Preventive Maintenance Program adopted by Western over a year ago. The second picture perfectly illustrates the order and efficiency offered by this program.

RESULT: Economic and efficient operation of equipment.

Why don't you take advantage of the know-how offered by this FREE program. A Cities Service Fleet Specialist specifically tailors this program to meet the demands of your operational schedule. Cities Service will also help train your personnel to operate this program with a maximum of speed and efficiency and a minimum of paper work.

The basic program consists of:

1. Individual vehicle maintenance records and control folder.
2. A truck-bus maintenance work sheet.
3. A manufacturer-approved truck and bus lubrication chart.
4. A driver's vehicle condition report for each vehicle.

For full information call your local Cities Service Office. Or write: Cities Service Oil Co., Sixty Wall Tower, N. Y. 5, N. Y.

CITIES SERVICE

QUALITY PETROLEUM PRODUCTS

REALLY SHARP ON TURNS

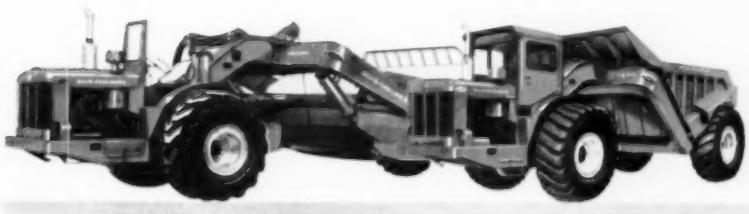
The all-hydraulic, 20-ton capacity TR-260 makes U turns in less than 26½ ft... saves up to 15 seconds per cycle over conventional haulers.

The 230-hp Allis-Chalmers TR-260 turns in less space than any wagon of comparable size. Complete U turns are made in less than 26½ ft. All-hydraulic, 2-stage steering with double-acting steering jacks gives you 2-way power pulling out of full turns. At the shovel and hopper, this kind of turning can save you up to 15 seconds per cycle over conventional haulers.

In addition, the sharp-turning TR-260 also gives you the benefits of KON-TORK *differential* and *plenty of tractor and wagon underclearance* to keep you on-the-go.

These are just a few reasons why the 20-ton capacity TR-260 brings you extra profits on your hauling jobs. Your Allis-Chalmers dealer will give you all the facts on both the TR-260 and the 12-ton capacity TR-160. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wisconsin.

You get double value and lower basic equipment investment when you use the 9.5-cu-yd TS-160 and 17-cu-yd TS-260, the 12-ton TR-160 and 20-ton TR-260 units. Both can be interchanged... together they eliminate need for specialized equipment.



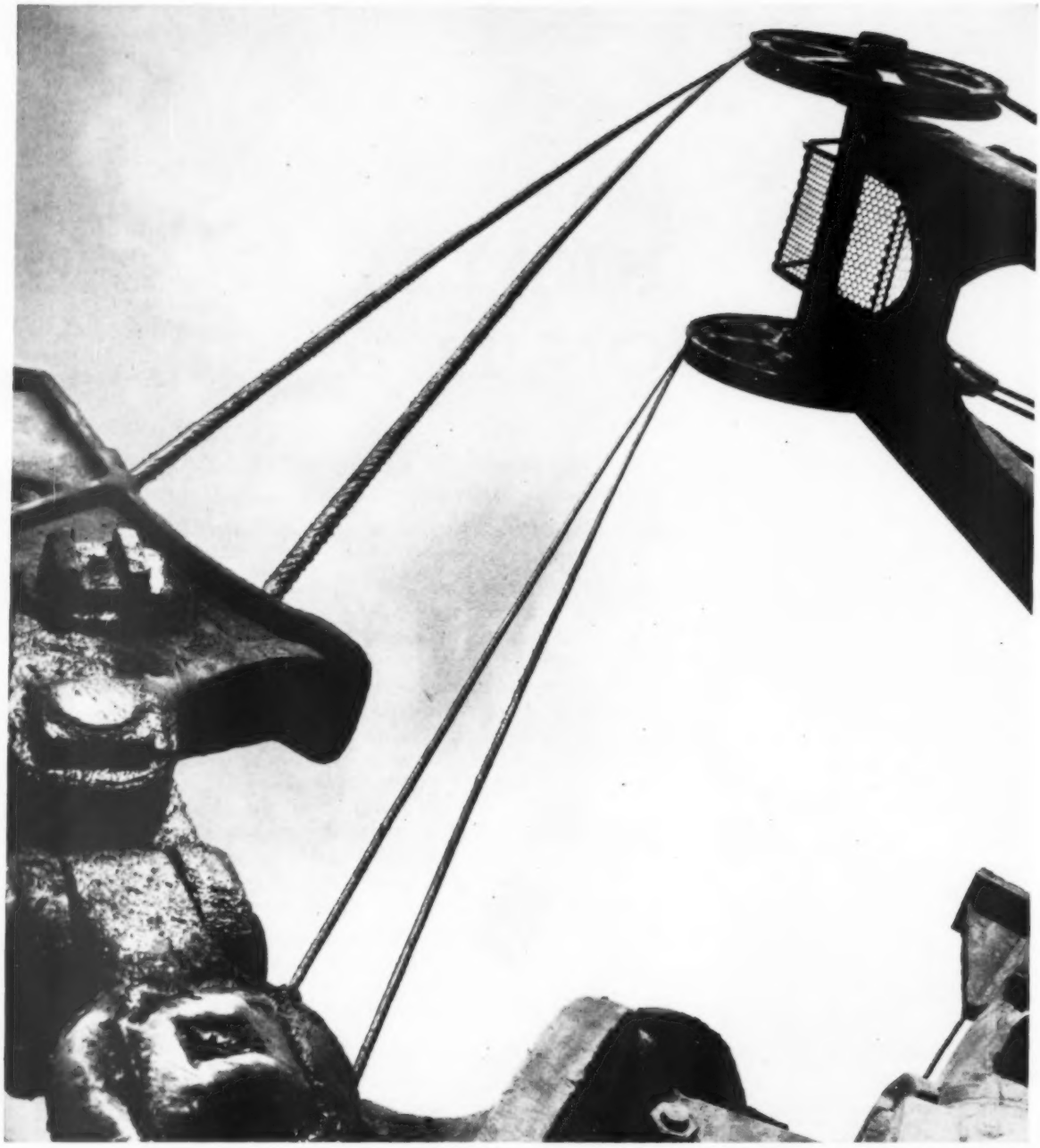
KON-TORK is an Allis-Chalmers trademark.

move ahead with

ALLIS-CHALMERS

... power for a growing world

Enter 188 on card, page 233



IF THE WIRE ROPE YOU'RE USING
HASN'T GOT IT HERE...IT HASN'T GOT IT

This rope has it—and has it at every critical point of wear for these reasons:
Extra Resistance to Bending Fatigue · Extra High Strength
Good Flexibility and Excellent Resistance to · Shock · Abrasion · Impact · Crushing
For anything you want to know about Roebling Royal Blue Wire Rope, ask your Distributor or Roebling's Wire Rope Division, Trenton 2, N. J.

ROEBLING

Branch Offices in Principal Cities *John A. Roebling's Sons Division · The Colorado Fuel and Iron Corporation*

Has no springs, rides on Hydrair*

— With Haulpak's exclusive air-hydraulic suspension system, you completely eliminate maintenance and repair of springs. 4 Hydrair units cushion against loading and travel shocks . . . keep unit riding level over bumps and holes. LW Haulpak also has exclusive LW power-transfer differential — permits unit to haul over wet, muddy areas that bog down competitive trucks.

You'll haul more tons per hour at lower cost . . . with LW Haulpak®

This revolutionary off-highway truck gives you highest output at lowest ownership and operating costs. You get these profit-making benefits because the all-new, fully-proven LeTourneau-Westinghouse Haulpak is built *specifically* for rugged, heavy-duty hauling. It is not a "beefed-up" highway truck . . . nor does Haulpak have the maintenance problems common on ordinary haulers.

Notice, for example, Haulpak's rugged "V"-shaped body. This exclusive LW design gives you *bonus* yardage within a short wheelbase . . . makes for easy loading . . . and provides a low center of gravity for exceptional stability.

LW Haulpak's short, 130-inch wheelbase gives you unusual maneuverability (makes non-stop U-turn in area only 44'6" wide . . . shortest turning radius of any big off-road truck). You spot, swing around, back up and dump *fast* . . . you eliminate most maneuvering delays, complete faster cycles. You have "feather-touch" power-steer, too . . . system is located high behind bumper, well protected from damage.

And, very important, time lost for maintaining your Haulpak is practically nil. It needs *no* daily lubrication. The entire Haulpak lubrication check — *needed only at 500-hr intervals* — consists of just 4 easily-reached grease fittings. In addition, LW Haulpak's various parts and assemblies — some of them tested and proved by *millions of hours* on LW Tournapulls® all over the world — are much stronger than those used on competitive haulers.

Low loading height — (only 10'1" on 32-ton size) and large top opening (14'5" x 11') makes it easy to load LW Haulpak *fast*, without spillage.

22, 27, 32-ton sizes

Ask us for detailed specifications on the size LeTourneau-Westinghouse Haulpak that fits your needs. Available in 22, 27, and 32-ton sizes. Compare its features with any other truck in the industry . . . you be the judge!

*Trademark HP-2155-G-1

LeTOURNEAU-WESTINGHOUSE COMPANY, PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

Where quality is a habit

HEAVY DUTY

HYDRASTROKE* FEEDER for PLANTS and QUARRIES

Exclusive HYDRAULIC OPERATION

A Reciprocating Feeder easily adapted to feed Screens, Crushers, Belts Trucks, Skips or Railroad cars.

PATENT APPLIED FOR

FEEDER DESIGNED FOR SEVERE SHOCK LOADING

ROCKER MOUNTING OR SUSPENSION
eliminates wear due to friction, needs no lubrication, takes minimum head room.

WIDE RANGE OF SIZES
widths from 36" to 96" feeding capacities from 200 to 7500 tons per hour.

*TRADEMARK

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SUBSIDIARY OF PETTIBONE MULLIKEN CORP., CHICAGO 51, ILLINOIS

Enter 192-A on card, page 233

"TIRED" in a wink!

You'll get "tired" in a wink when you use Southern Tire's time-tested 'round-the-clock scheduling for your retreading needs. Fast, efficient pickup and delivery service at your job site . . . *after work hours* . . . helps you cut costly downtime . . . lick tough schedules. And retreads as much as ¼" deeper than ordinary retreads mean longer service for your tires under rugged conditions! Expert workmanship, ultra-modern equipment plus finest quality rubber manufactured to Southern Tire's own specifications guarantee *new tire* mileage at approximately half of new tire cost!

OVER 75,000 TIRES WORTH OF EXPERIENCE!

All sizes from 1100 x 24 to 33.5 x 33.

Always deal with an independent—developers of every major improvement in the industry.

SOUTHERN TIRE COMPANY

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SHEFFIELD, ALA.

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Enter 192-B on card, page 233

Enter 193 on card, page 233 →

Cut pit costs with Tournatractor®. . .

It travels faster ...works faster

For your *own* satisfaction, determine the money-saving advantages you get with a big LeTourneau-Westinghouse Tournatractor. Do some stop-watch-timing on this tractor and compare its performance with any tractors you may *now* own.

You'll find, if assigned to clean-up duty around a number of scattered shovels for instance, that a track-type tractor spends much of its time just traveling between jobs. And travel time accomplishes *nothing*. It only adds to your operating costs. Or, if you assign one tractor to *each* shovel, you'll notice that here, too, there's liable to be a lot of waste time, because there isn't enough work to *keep one tractor busy*.

Fast work and travel speeds offer a big advantage

With Tournatractor, you cut tractor "travel overhead" by more than half. That's because, on job-to-job travel, Tournatractor moves more than twice as fast as the fastest crawler tractor. It runs between assignments . . . at speeds to 17 mph! You'll find a single rubber-tired LW tractor handles more work over a wider area than 2 *or more crawler tractors!*

And because Tournatractor is fast, don't get the idea it's just a "hit-and-run" flyweight. Not on your life! It's got the sock and ruggedness of a true "heavy". With 218 hp and up to 15 tons of work-weight, it can match production with any tractor its size. Use an LW tractor for shovel clean-up . . . for spotting rail cars . . . for fast push-loading or towing service . . . for heavy construction or dozing to improve haul roads and drainage. You'll also find Tournatractor a "natural" for compacting stockpiles, because when those big tires are hydroflated, Tournatractor provides compaction equivalent to an extra 20-ton roller.

Let us show you how Tournatractor can fit into *your* operations. See how this fast, mobile machine can help you cut costs in a hurry!

CT-2202-MQJ-1

This Tournatractor is one of 3 owned by Bagdad Copper Corp., Bagdad, Arizona. At its open-pit mine the firm works LW tractors 16 hours a day to clean-up around shovels . . . to maintain waste dumps and haul roads . . . to tow stalled trucks and other equipment. Says Mine Superintendent Edward L. Jones, "Our Tournatractors complete a variety of scattered jobs over a wide area fast!" Operator Edgar D. Owings adds, "I sure like the torque converter on this tractor and the big low-pressure tires have more traction, make it smoother riding, too."

LeTOURNEAU-WESTINGHOUSE COMPANY, PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

Where quality is a habit

Enter 193 on card, page 233 →

Porter Kilmag Brick

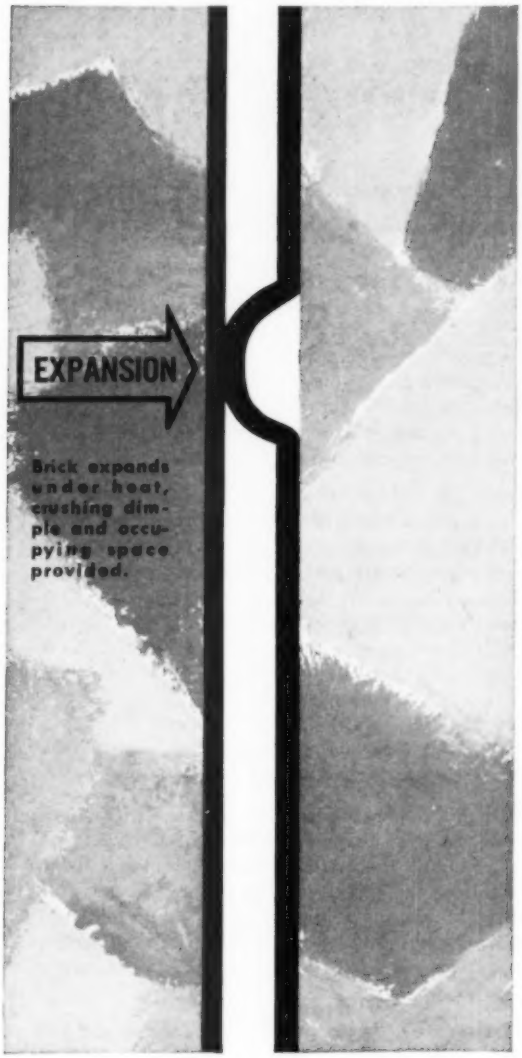
requires no "paper work"... dimpled steel spacers set up perfect expansion allowance

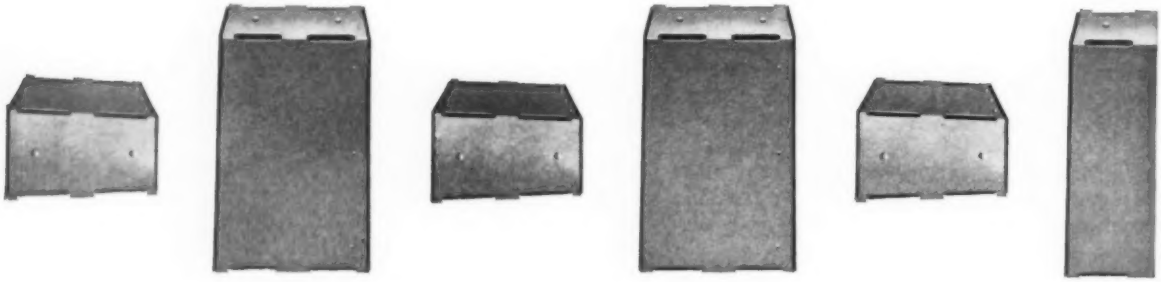
Porter Kilmag is a burned, magnesite-chrome brick with patented* "dimple" cladding . . . *an exclusive Porter feature!* Because of Kilmag's dimple cladding, you get these important mechanical advantages: (1) Kilmag requires no added labor, "paper shimming" or other field expedients to establish proper expansion. (2) Kilmag lays up faster. (3) Kilmag reduces labor costs. (4) Kilmag's expansion dimple is permanent *regardless* of storage conditions.

Kilmag's refractory qualities match its mechanical excellence. A dense, thoroughly burned structure provides uniform strength from cold to hot face, under stress. Kilmag has an exceptional ability to build and *hold* a clinker coating. Kilmag brick are available in 6″ arches and 9″ wedges. One shape turns a given diameter, plus a ⅔ and a ¾ brick for keying up.

For complete details on cost-saving, high efficiency Porter Kilmag, or *any* refractory application, write: *Refractories Division, H. K. Porter Company, Inc., Porter Building, Pittsburgh 19, Pa.* *Pat. Pending

FOR ROTARY KILN LININGS:

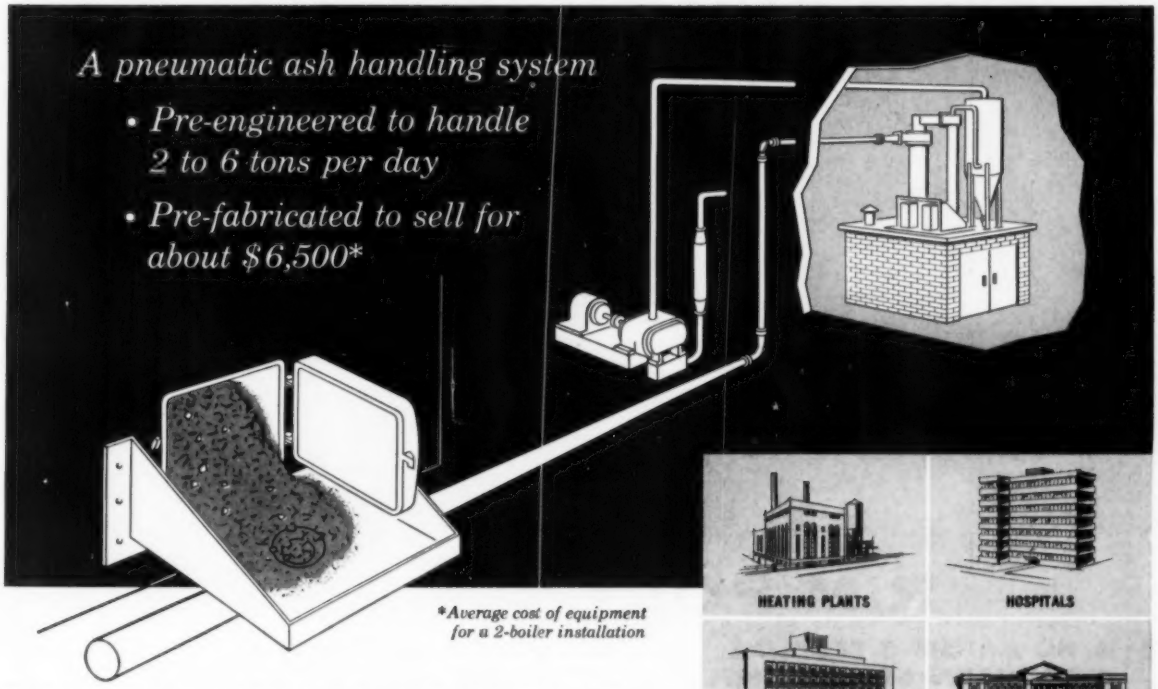




REFRACTORIES DIVISION **PORTER** H.K. PORTER COMPANY, INC.

PORTER SERVES INDUSTRY with steel, rubber and friction products, asbestos textiles, high voltage electrical equipment, electrical wire and cable, wiring systems, motors, fans, blowers, specialty alloys, paints, refractories, tools, forgings and pipe fittings, roll formings and stampings, wire rope and strand.

THE FIRST BIG BREAK IN ASH HANDLING COSTS
FOR THE SMALL COAL BURNING PLANT



*Average cost of equipment for a 2-boiler installation

Engineers of small coal burning plants—Heating Plants, Hospitals, Hotels, Institutional Buildings, Military Installations, Municipal Power Plants, Office Buildings, Schools, Colleges, Small Industrial Plants—have long wished for a small, practical ash handling system that would eliminate much of the inconvenience, dust and constantly increasing labor costs of manual ash removal. Available ash removal systems could not be economically justified where less than 10 tons of ash per day was produced.

Aware of this need, The Allen-Sherman-Hoff Company assigned its best engineering talent to untangle the problem. The result: the *new* A-S-H ECONO-ASH System.

A major step in solving this problem was pre-engineering. Use-proved designs of major components were re-engineered to handle smaller quantities; new equipment was designed and tested. One requirement was basic: cost reduction without loss of efficiency. Installation, for example, was made so simple that it can be made with local labor.

We've prepared a 4-page brochure to explain the *new* ECONO-ASH System—how it operates, its variations and its advantages. We'll send it to you immediately upon request. It also lists the A-S-H Sales Engineers—one is near you—who will be glad to show you how, in most installations, the *Econo-Ash will pay for itself in two years or less.*

MATERIALS HANDLING SYSTEMS

ASH

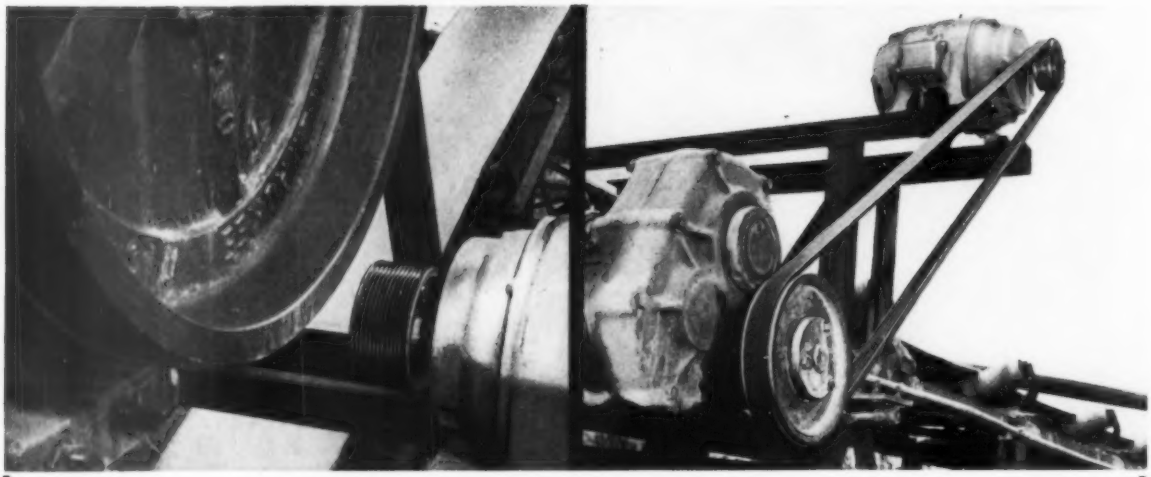
the **Allen-Sherman-Hoff** company

245 E. Lancaster Ave., Wynnewood, Pa.

Offices and representatives in principal cities

More power...in less space

WITH MORE RELIABILITY



R/M POLY-V® DRIVE

- NO MATCHING PROBLEMS
- MAINTAINS GROOVE SHAPE
- COMPLETE CONTACT-PRESSURE
- CONSTANT PITCH AND SPEED RATIOS
- LESS MAINTENANCE— LESS TAKE-UPS
- LESS WEAR ON BELT AND SHEAVES

Power to spare is delivered by these R/M Poly-V Drives to assure trouble-free operation of the belt conveyors made by Lippman Manufacturing Company for an aggregates plant. Here's why. Poly-V Drive design provides greater horsepower capacity—delivers more power per inch of drive width than ever before possible with conventional multiple belt drives.

Poly-V features a *single* unit V-ribbed belt across full width of sheaves with mating grooves. It is not an assembly of V-belts. Single unit belt design eliminates belt length matching problems. These conveyors thus operate with minimum downtime and belt replacement costs . . . run cooler, smoother under *all* drive loads.

Just two cross sections of Poly-V Belt meet *every* heavy duty power transmission requirement. Ask your R/M Distributor for details about R/M Poly-V* Drive for your application.

Write for Bulletin M141

WHEN YOU CHANGE DRIVES...

*Patented

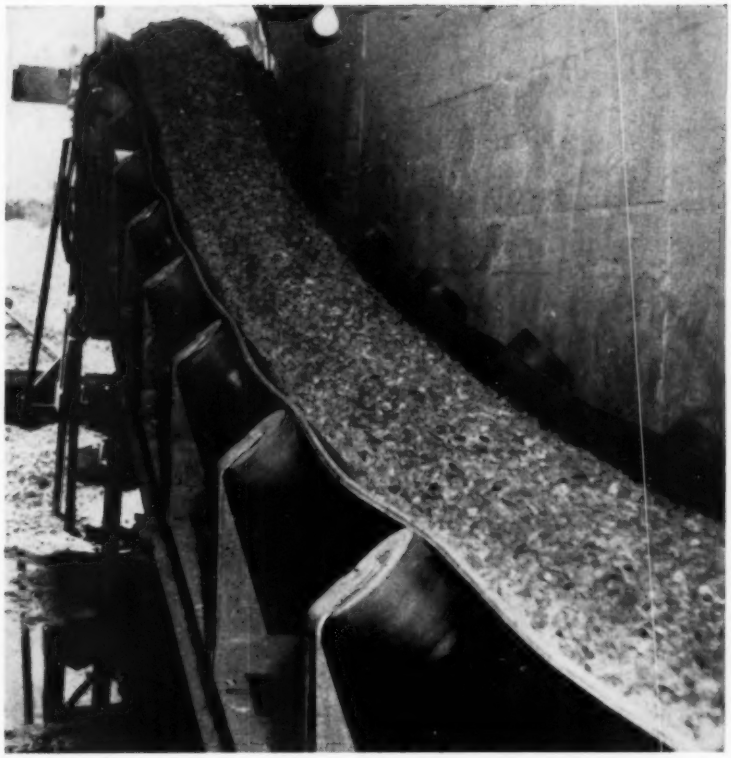
CONVERT TO POLY-V® AND BE SURE!

RM1010

ENGINEERED RUBBER PRODUCTS ... MORE USE PER DOLLAR

RAYBESTOS-MANHATTAN, INC.

MANHATTAN RUBBER DIVISION, PASSAIC, NEW JERSEY



RAY-MAN CONVEYOR BELT

Engineered for 45° Idlers

- TRAINS NATURALLY
- TROUGHS DEEPLY
- HOLDS FASTENERS
- RESISTS IMPACT AND RIPPING
- REQUIRES NO BREAKER PLY
- DOUBLE COMPENSATION RELIEVES OUTER PLY STRESS
- EXCLUSIVE "XDC" LONG-WEAR COVER

Every component of a Ray-Man Conveyor Belt is *precision proportioned* to give you a balanced belt construction, with as much as ⅓ longer life expectancy. It's the same as getting ⅓ more conveyor belt for your money. Further savings are possible, if you use 45° Idlers. Properly engineered, you can haul a fuller load, or install a narrower conveyor. Ray-Man is guaranteed against ply or cover separation at the hinge line where the 45° angle proves too sharp for regular belt constructions. Write for Bulletin M303.

HOMOFLEX HOSE

more flexible, weighs less than any hose for equal pressure

- SUPER-STRONG
- PRECISION BUILT
- NO PRE-SET TWIST—WILL NOT KINK
- INSEPARABLE TUBE-TO-COVER BOND
- UNIFORM INSIDE AND OUTSIDE DIAMETERS
- EASIER, SAFER COUPLING

Strong, lightweight, and "flexible as a rope"—Homoflex is the easiest handling hose and lasts longer. Made in types for air, water, other fluids and gases. Ask about other types of R/M rubber hose for your job applications. Write for Bulletins M620 and M694.

Template shows how these Ni-Hard single-wave liner plates still retain their contour after 30 months of grinding. Mill was lined with 7 materials for test — two rows apiece. Pretoria Portland Cement Co. now specifies Ni-Hard liners for dry-mill service.

Template shows how

NI-HARD liners out-perform all others in 30-month ball-mill test

A gruelling 2½-year cement-grinding test proved two big advantages of Ni-Hard* iron mill liners:

(1) uniform wear and

(2) longer life by far.

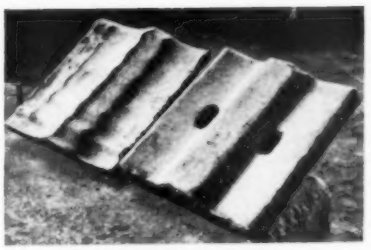
The Pretoria Portland Cement Co., Johannesburg, South Africa, tested Ni-Hard mill liners against six other materials . . . in a 20-ton-per-hour dry cement mill using 2 to 4-inch grinding balls.

Ni-Hard liner plates resisted abrasion 6 times better than those of the next best material. The Ni-Hard liners lost an average of only 7.9 pounds per segment: second best material lost 50. Another material averaged a 79 pound weight loss per segment.

The reason: Ni-Hard is a nickel-chromium white iron alloy specially developed for outstanding abrasion-resistance.

Ni-Hard liners stay hard, keep their shape down to the last ¼"... increase grinding efficiency and deliver long-term savings.

If you'd like to grind more cement with less downtime, contact your nearest Ni-Hard producer for information about Ni-Hard liners for your own mills. Or, write Inco today for a list of authorized producers and helpful technical information.



HERE'S THE PROOF . . .

Compare these plates, shown after several years' cement-mill service. Left: alloy-steel plate. Right: liner plate of Ni-Hard cast iron.

*Registered trademark

The INTERNATIONAL NICKEL COMPANY, Inc.
67 Wall Street New York 5, N. Y.

NI-HARD

NICKEL ALLOYS PERFORM BETTER LONGER

ALEMITE® ACCUMATIC SYSTEM

provides safe, accurate, instant lubrication . . . seals completely against abrasive dust!

With the help of a modern Accumatic Centralized Lubrication System, this power shovel can be lubricated on the job, *between shovel loads*, at the touch of a button! No overtime or downtime is necessary for lubrication. No climbing to dangerously located bearings. A pre-determined amount of the proper lubricant reaches each bearing. *All* bearings are lubricated from one central point. Lubrication is safe and sure. The proper quantity of the correct lubricant is applied—without waste. Bearing life is prolonged.

Type II Accumatic Measuring Valves, used in this system, are fully hydraulic. Completely sealed for *clean* lubrication of power shovel. They handle all fluid oils and lighter greases up to a NLGI-2 rating. Available in four sizes—from .050 to .500 cubic inches.

Write for Accumatic catalog today!

Symbol of SW Excellence

ALEMITE DIVISION
STEWART-WARNER CORPORATION

Dept. L-50, 1850 Diversey Parkway, Chicago 14, Illinois

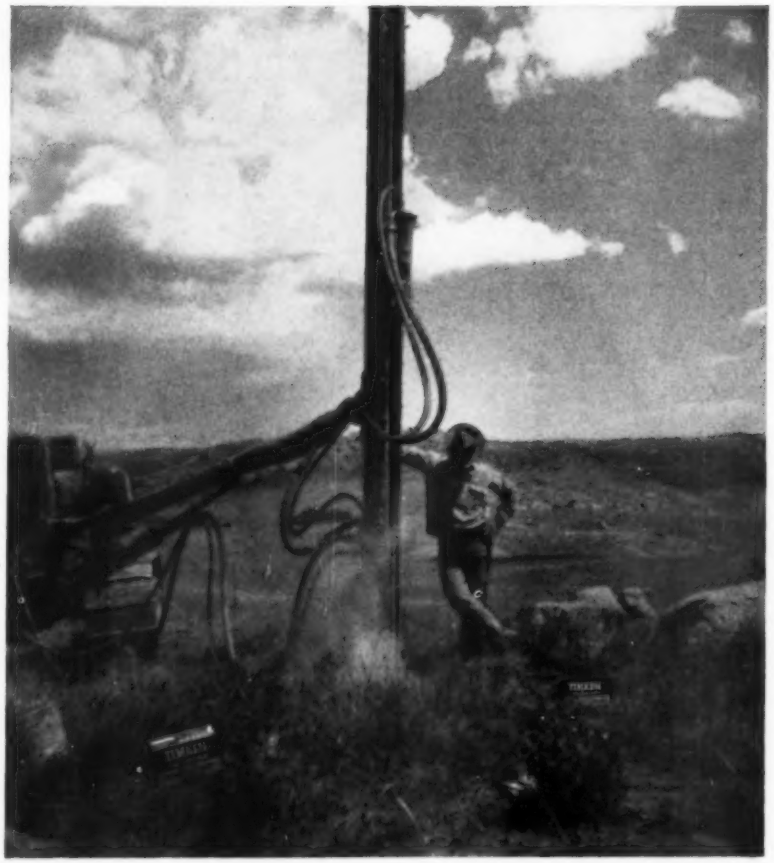
"WE DRILL 15% MORE...AND DRILL IT FASTER... WITH TIMKEN CARBIDE INSERT BITS"

Special report from H-E Lowdermilk, Inc.

LOCATION: U.S. HWY. 287, LARAMIE, WYOMING

Operating conditions: granite and schist

H-E Lowdermilk, Inc. of Virginia Dale, Colo., had to drill through hard abrasive ground—mostly granite and schist—in constructing U.S. Highway 287 between Ft. Collins and Laramie. So they chose Timken carbide insert bits and drilled 15% more feet-per-bit! And they drilled faster, too, because the Timken bits stayed sharper longer than other bits they had used.



Which Timken Bit should you use?

The Timken carbide insert bit is your most economical bit in hard, abrasive ground. But in softer ground, use the low-cost Timken all steel multi-use bit. And because both bits are interchangeable in the same thread series, you can switch bits when the ground changes. Dozens of different Timken bits fit the same drill steel. Both are made from Timken electric-furnace fine alloy steel, have special shoulder unions that protect threads against drilling impact. For help in selecting the right Timken bit for your job, phone or write: The Timken Roller Bearing Company, Rock Bit Division, Canton 6, Ohio. Cable: "TIMROSCO". *Makers of Tapered Roller Bearings, Fine Alloy Steels and Removable Rock Bits.*

TIMKEN®

removable rock bits

Industry Personalities

C. W. Ireland

CHARLES W. IRELAND, board chairman of Vulcan Materials Company, was recently awarded a certificate of merit by the National Construction Industry Conference for his outstanding contributions to the construction industry. In announcing the award, Erwin D. Canham, president of the United States Chamber of Commerce, of which the conference is a part, said that Mr. Ireland had aided the expansion and development of the construction industry in particular, and the advancement of the free enterprise system in general.

Mr. Ireland is described as chief architect of the combination of companies which became the Vulcan group. This group, reported as the largest producer of construction aggregates in the United States, operates 110 production facilities in 15 states.

GEORGE L. COBB has been named works manager for the Zanesville, Ohio, plant of the Columbia Cement Corporation, a wholly-owned subsidiary of Columbia-Southern Chemical Corporation. He succeeds the late Walter K. Farst. Mr. Cobb was chief engineer at Columbia-Southern's chemical plant at Natrium, W. Va.

C. REX MORGAN has been promoted to the position of manager of the National Gypsum Company's new Lorain, Ohio, plant. He joined National Gypsum in 1951 and since 1956 has been manager of the Portsmouth, N. H., plant.

HENRY R. RICHMOND, formerly assistant to D. L. MARLETT, vice-president and division general manager, Great Lakes Carbon Corporation, has been made general sales manager of the firm's Mining and Mineral Products Division, Los Angeles. He takes over the post from the division's assistant manager, JOSEPH E. MORAN, who was also acting general sales manager.

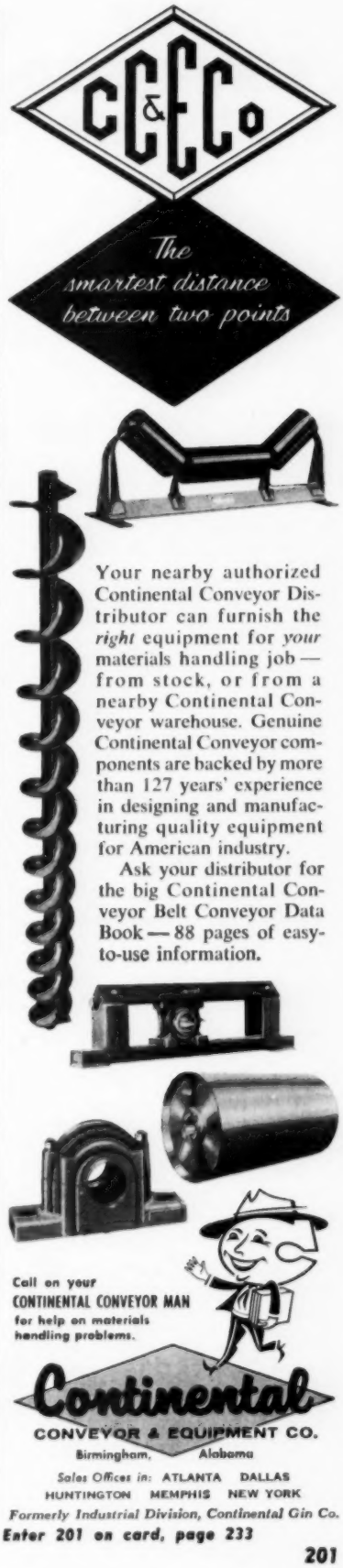
Appointment of two sales managers to supervise the marketing of the firm's diatomite and perlite products has also been announced. GORDON G. HALVORSEN will be sales manager for Dicalite filteraids and fillers, and WILLIAM R. HOWELL will be sales manager for perlite ore.

C. B. Laws

CHARLES B. LAWS has been appointed southern regional sales manager for the Solite Corporation (formerly the Southern Lightweight Aggregate Corporation), Richmond, Va. The territory includes North Carolina, South Carolina, Georgia, and Florida. Mr. Laws was formerly district sales manager for Carolina Solite Corporation, a wholly-owned subsidiary of Solite Corp.

W. T. TILLOTSON, has been named general manager of the Idaho Phosphate Works of Central Farmers Fertilizer Company, Georgetown Canyon, Idaho. In the past, he served in the capacities of plant engineer, chief engineer and vice-president in charge of manufacturing for U.S. Gypsum Company and American Rockwool Corporation.

G. W. BALLANTYNE has retired from the positions of assistant secretary and assistant treasurer of Ideal Cement Company. He has been succeeded by ROBERT J. SWENSON, previously the firm's general tax ac-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Your nearby authorized Continental Conveyor Distributor can furnish the *right* equipment for *your* materials handling job — from stock, or from a nearby Continental Conveyor warehouse. Genuine Continental Conveyor components are backed by more than 127 years' experience in designing and manufacturing quality equipment for American industry.
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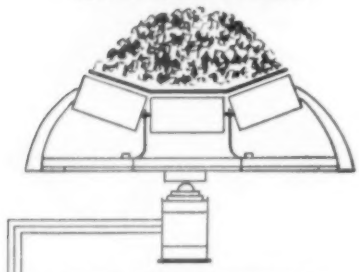
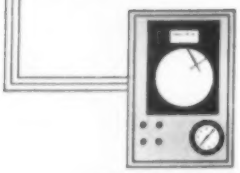
ONE SIMPLIFIED SYSTEM



CONVEYS WEIGHS CONTROLS



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CON-O-WEIGH is the one package system that weighs . . . controls (feed rate, load, speed) . . . and records data for conveyor-carried bulk materials. This precision mechanism insures record tonnages in sand and gravel production through automatic weighing of material in process. In complex operations, such as batching, the CON-O-WEIGH System is the ideal, job-proved way to reduce costs, maintain quality control and eliminate production line tie-ups.

Facts and figures promptly available on how to equip new or existing plants with . . .

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Salt Lake City 2, Utah

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countant. WILLIAM H. WELSH, who has been with the Internal Revenue Service for the last six years, has been retained for the post of general tax accountant.

HUGH O. JONES JR. has been appointed works manager of the new $6,000,000 mine and manufacturing plant of United States Gypsum Company at Sperry, Iowa. He was previously works manager at the New Orleans plant.

FRED W. POLLEI has been named to the post of sales manager for Portland Cement Company of Utah, Salt Lake City. He was formerly associated with Ideal Cement Company for the last 15 years.

JOHN S. DODS has been named plant manager at the Neville Island plant of Pittsburgh Coke & Chemical Company. Mr. Dods, who joined the company in 1929 as a cement analyst, succeeds C. R. SIZEMORE, retired. Prior to his present appointment, Mr. Dods was general superintendent of the Coke & Iron Division.

E. D. Hill Sr.

EUGENE D. HILL SR., board chairman of Louisville Cement Company for the last two years, retired from the chairmanship the end of March, but will continue as a director. He was president of the firm from 1939 to 1958.

RAY K. HARTSOCK, vice-president of Louisville Cement, also retired in March. He was associated with the company for 35 years.

ERWIN F. BECKER, United States Gypsum Company, has been appointed field manager, quality, at Jacksonville, Fla. Mr. Becker joined United States Gypsum in 1953 at Jacksonville. He subsequently became field manager, quality, at Atlanta, Ga.

K. Ellsworth

W. W. Mein Jr.

N. J. Redmond

The Flintkote Company has announced the elections of KENNEDY ELLSWORTH, W. W. MEIN JR., NOEL J. REDMOND, W. L. DAVIS, and H. J. ROBERTSON as vice-presidents. All are operating heads of Flintkote divisions, and have been long identified with the operations of their respective divisions.

Mr. Ellsworth is general manager of U. S. Lime Products Division. Mr.

H. J. Robertson

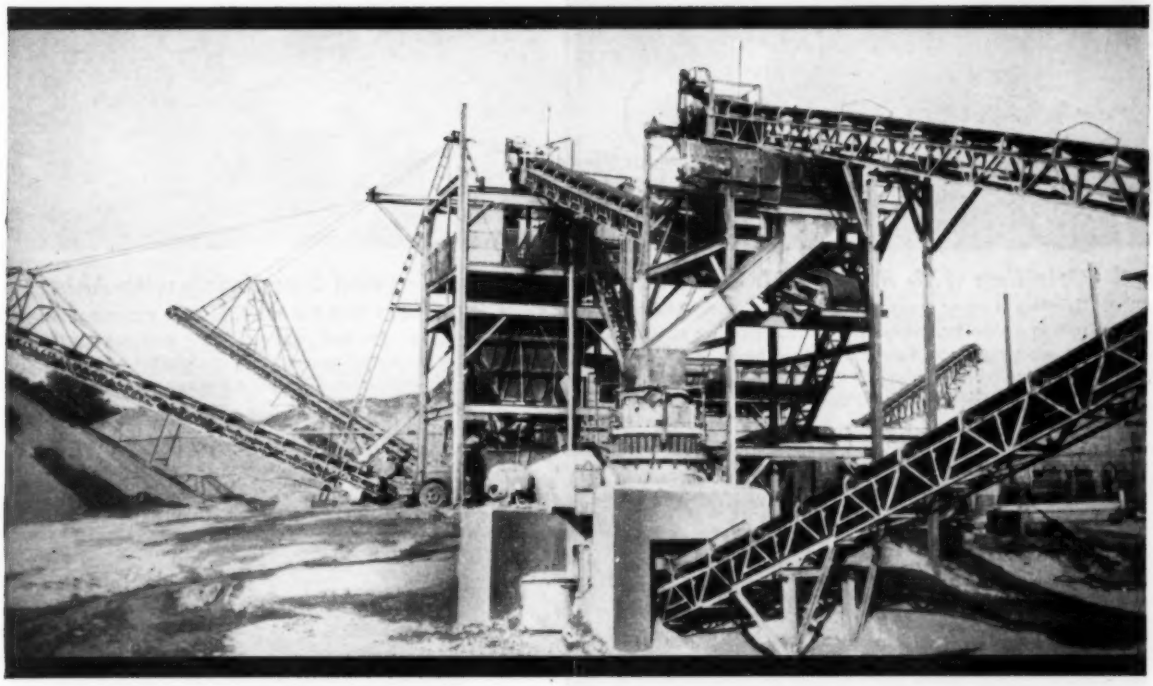
W. L. Davis

Mein is president of Calaveras Cement Division. Mr. Redmond, a Flintkote director, is president of Blue Diamond Division (a West Coast gypsum producer). Mr. Davis, a Flintkote director, is president of Hankins Container Division. Mr. Robertson, a Flintkote director, is president of Orangeburg Manufacturing Division (pipe and conduit).

The retirement of E. LAWRENCE CHANDLER as assistant secretary of the American Society of Civil Engineers, effective March 31, has been announced. Mr. Chandler will continue in his post as treasurer of A.S.C.E., a post to which he was named in 1959.

At the same time, the Society's Board of Direction announced that Mr. Chandler had been selected as

HOLLY MANUFACTURING AND MINING COMPANY processes 300-400 tons of gravel per hour with 5 SIMPLICITY screens!



Write for information on Simplicity equipment today.

At the Holly Manufacturing and Mining Company, Holly, Michigan, pit run gravel is brought from the pit to a surge pile on belt conveyors. From the surge pile, a belt conveyor takes the gravel to a Simplicity 5′ x 14′ Model "D" 2-deck screen. At this point, all oversize material, including rocks up to 8 inches in diameter, is run through a cone crusher and then re-circulated to the screen. A belt then takes all through material to two Simplicity M-11 4′ x 12′ 3-deck screens where the gravel is washed, sized, then stockpiled to be used as needed. The other 2 Simplicity screens are used for processing special products.

All 5 Simplicity screens have been in operation for over two years, part of the time on a two-shift schedule, with a minimum of down time.

Gravel plant operators are getting quick, economical and dependable processing of their material with Simplicity Screens, Feeders and Conveyors.

SALES REPRESENTATIVES IN ALL PARTS OF THE U.S.A.
FOR CANADA: Simplicity Materials Handling Limited, Guelph, Ontario.
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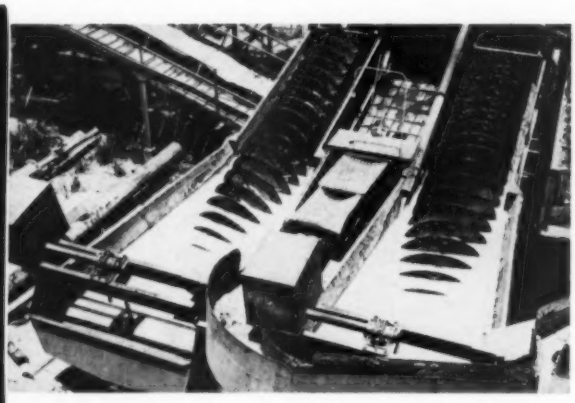
ENGINEERING COMPANY • DURAND 12, MICHIGAN

220

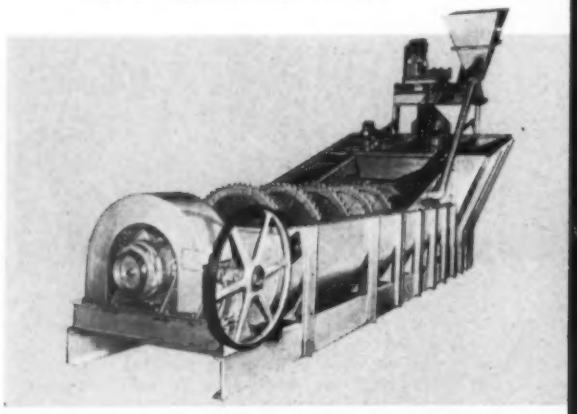
Need specification aggregate?

4 low-cost ways to produce it, on location!

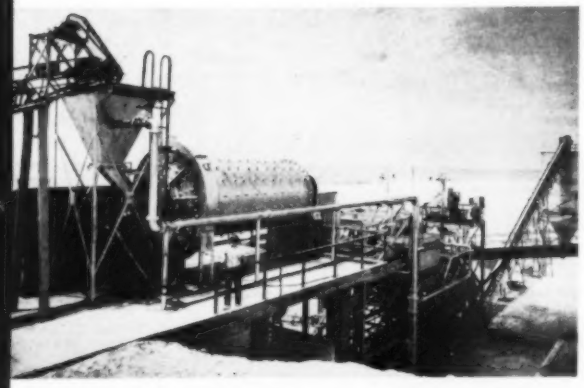
1 *Grinding with Marcy CPD Rod Mills* Grinding stone or waste pea gravel in a Marcy Mill results in a superior, cubical product for blending to meet the most rigid specifications. Marcys have kept many small operators in business; and, have been used on almost all large government dam jobs.



2 *Washing and Classifying with Akins Classifiers* With the Akins Classifier you can wash, deslime, dewater, and remove or save sand sizes as desired. A large working pool area in classifier is required to do this work...the Akins gives you more working pool area per dollar.



3 *Separating with Akins Heavy Media Separators* Many deposits can be most efficiently treated by the Akins heavy media process. The Akins' large working pool area permits close control of products from feed of variable quality or quantity. Reduced media recirculation in the Akins results in lower total horsepower required.



4 *Scrubbing with Marcy Heavy-Duty Scrubbers* Thorough, efficient removal of clay from sand can be accomplished with Marcy Scrubbers. The Marcy principle of small diameter, long length scrubbers gives longer retention time, more contact for scrubbing, less short-circuiting, and lower horsepower...a principle which has been proven on difficult washing of iron ore.

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The Company that cares enough to give you the best!

Manufacturing Division

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Licensed Manufacturers and Sales Agents in Canada, Australia, Sweden, England, South Africa
Sales Agents in Peru, Chile, Philippine Islands, Japan, New York City (for Continental Europe) and in principal cities of the United States.

the first recipient of the recently established A.S.C.E. Professional Recognition Award, presented for substantial contributions to the status of the engineering profession.

R. A. Marshall

R. H. Campbell

ROBERT A. MARSHALL, formerly general sales manager of the Medusa Portland Cement Company, was elected vice-president and general sales manager at the recent annual meeting of the board of directors. He is in charge of sales for all eight Medusa plants and eight district offices in the United States and Canada.

At the same time, announcement was made of the retirement of RALPH H. CAMPBELL, vice-president-commercial, after a 26-year association with the firm. Most recently he has been in charge of all sales at Medusa's national headquarters in Cleveland.

DR. ALLAN D. FRANKLIN has been appointed chief of the Mineral Products Division of the National Bureau of Standards; he has been acting chief since November, 1959. Dr. Franklin succeeded DR. IRL C. SCHOONOVER, who is now the bureau's associate director for planning. In his new post, Dr. Franklin will direct research on properties of nonmetallic inorganic solids.

PATRICK H. HOY will succeed IRVING CROWN as president of Material Service Division of General Dynamics Corporation when the latter steps up to the post of vice-chairman of Material Service. ROBERT J. EATINGER has been named assistant director of industrial relations for the firm.

JOHN J. SULLIVAN has succeeded MATTHEW L. FITZGERALD as executive secretary of the State Bituminous Concrete Producers Association, Albany, N.Y. The association, with headquarters in the Manger DeWitt Clinton Hotel, represents 95 percent of the blacktop producers in the state.

J. A. Bader

JOHN A. BADER, formerly district manager of sales for Republic Steel Company at Hammond, Ind., has been named Chicago district sales manager of Dundee Cement Company. He is the first district sales manager to be appointed in the new company.

Also appointed to the sales organization were JOSEPH L. DELEMERE as sales co-ordinator, and JOHN H. KENLEY JR. as sales representative. DOUGLAS C. SHANKS has been appointed purchasing agent.

M. J. BOWMAN, assistant insurance manager of American Potash and Chemical Corporation, has been elected president of the Southern California chapter of the American Society of Insurance Management. NORMAN E. HORNEY of Consolidated Rock Products Company was elected secretary of the chapter, and KENNETH J. FLEISCHHAUER of Blue Diamond Corporation was named a director.

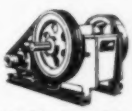
E. J. HILL has been elected vice-president in charge of administration by the board of directors of Maule Industries, Inc.

Mr. Hill joined Maule a year ago as an assistant to the president. Before that he had been associated with Colton Chemical Company of Cleveland, a division of the Air Reduction Corporation.

E. J. O'LEARY, president and chairman of The Ruberoid Company, has been elected a director of Cumberland Chemical Corporation, which is jointly owned by Ruberoid and Air Reduction Company, Inc.

The Company that cares enough to give you the best!

Laboratory Equipment



4"x 6" Massco Laboratory Jaw Crusher

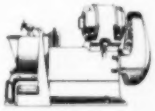
Welded steel frame; manganese steel jaw and cheek plates; bronze bushed bearings; smooth jaws give better product and easier cleaning. Adjust for plate wear and product size by convenient hand wheel adjustment.

6" and 10" Massco Gy-Roll Reduction Crusher

Reduces ½" feed to as fine as 10 mesh in single pass. High capacity, low power consumption.

Laboratory Crushing Rolls

Sizes (Diameter x width): 8"x 4", 10"x 6", 10"x 8", 12"x 10" and 12" x 12". Adjustable roll space setting up to ¾". Double V-belt drive. Heavy, cast Meehanite frame absorbs vibration, results in long life.



Massco-McCool Pulverizers

Disc type grinder with a planetery movement. No gears. Will grind ¼" to 150 mesh in one pass.

Marcy Pulp Density Scale

Gives direct reading of weight; specific gravity of liquids, pulps, and dry solids; percent solids in pulp. Very accurate. Easy to clean.

MINE AND SMELTER SUPPLY CO.

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OFFICES AND AGENTS IN PRINCIPAL CITIES

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Legal Decisions

On Industry Problems

By LEO T. PARKER
Attorney at Law
Cincinnati, Ohio

A few weeks ago the writer returned from extensive travels in Eastern and Southern States, and talked with many officials, owners and employees of producers, processors, buyers, and sellers of nonmetallic products and materials who presented to me some very interesting legal questions. A majority of these persons, of course, are especially desirous of avoiding expensive and time-consuming law suits. I shall briefly review these questions and give citations of higher court decisions to verify my hereinafter answers and opinions.

What Is Occupational Disease?

An official of a quarry corporation wants to know how the courts define an occupational disease. Also, he wants a list of states which have laws authorizing payment of compensation to employees who suffer occupational diseases, *e.g.*, silicosis.

A review of the laws of various states discloses that the following states, among others, have laws which allow payment of compensation under the State Workmen's Compensation Act for occupational diseases: Arizona, Arkansas, Delaware, Idaho, North Carolina, Ohio, Pennsylvania, Rhode Island, Utah, Virginia, Washington, and West Virginia.

Several states have special laws authorizing payment of compensation for pneumonoconiosis, silicosis and asbestosis. Some of these states are: Idaho, Illinois, Indiana, Maryland, Massachusetts, Michigan, Minnesota, New York, North Carolina, Ohio, Pennsylvania, Rhode Island, Washington, West Virginia, and Wisconsin.

See *Victory Sparkler Company v. Francks*, 128 A. 635, 638. This court said:

"An occupation or industry disease is one which arises from causes incident to the profession or labor of the person's occupation or calling. It has its origin in the inherent nature or mode of work of the profession or industry, and it is the usual result or concomitant."

If, therefore, a disease is not a customary or natural result of the industry, the disease is not an occupational disease.

Compensation Claim Not Revived

Last month a higher court rendered an interesting decision which answers this legal question: "If an employer delays in giving an injured employee medical treatment, is the employee's claim for compensation enlarged or extended?"

For illustration, in *Igoe v. S. Block Company*, 329 S. W. (2d) 39, a state law was litigated which provides that proceedings for compensation shall not be maintained by an injured employee unless claim be

Using 4-in ROPE thread Brunner & Lay Rok-Bits* on a 8- by 12-ft pattern to sink 40 ft holes in biotite granite, the Gainesville Stone Co. crews get an average of slightly better than 2 tons per lb of powder.

YOU, TOO, CAN BENEFIT BY THEIR TOP PERFORMANCE IN CHEWING OUT ROCK

For details on this and other difficult, low-cost Rok-Bit drilled jobs call our dealer, or nearest plant. Write for NEW complete catalog #759 on your company letterhead, stating your position. (*proved on every type of machine and job) Brunner & Lay, Inc., 9300 King St., Franklin Park, Ill. 77 progressive years. Plants and conversion shops: Albuquerque, Asheville, Birmingham, Dallas, Denver, Dorchester (Boston), Franklin Park, Long Island City, Los Angeles, Philadelphia, Sacramento, Seattle, Yardley (Spokane), Lachine, Que.

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INTRASET STEEL • COUPLINGS, ADAPTERS, STRIKING BARS & SECTIONAL STEEL • Standard or ROPE thread.

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"The No. 977 is in a class by itself...

Outproduces our other shovels 3 to 1—does a variety of jobs—shows no wear, after more than 1000 hours."

Osby Storey, Livingston Limestone Co., Livingston, Tenn.

A No. 977 Traxcavator is the "backbone" of this quarry operation. It strips overburden—sand-rock 6 to 10 feet deep—with the bucket pry out action making the job easy. It loads blasted rock for a crusher. It loads and stock-piles crushed rock and agricultural lime—fills a 5 cu. yd. hauling unit in 45 seconds. Owner reports that the heavy-duty track roller frame is just what's needed for working in blasted rock.

Versatility . . . speed . . . dependability . . . add up to top performance in a No. 977 Traxcavator. It's loaded with features that can pay off on your job.

Lifetime lubricated rollers need no lubrication until rebuilding . . . eliminate on-the-job shutdowns for servicing. The exclusive Caterpillar oil clutch gives up to 2000 operating hours without adjustment. With hydraulic track adjusters an ordinary grease gun is all that's necessary to properly adjust tracks.

The heavy steel main frame is a welded, one-piece unit. Box construction track roller frame absorbs the loads and stresses of hard work. Lift arms are made to stand up under the strain of heaviest digging conditions.

The No. 977 is fast—easy to operate. A quick-response hydraulic system cuts cycle time—increases maneuverability. Tractor controls are conveniently located for handling ease. Bucket controls at the right armrest are placed for easy operation.

From tracks to lift arms . . . the No. 977 is designed for low cost, top performance. Get the complete facts from your Caterpillar Dealer. He'll arrange a demonstration on *your* job.

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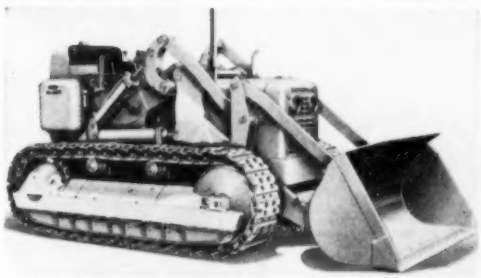
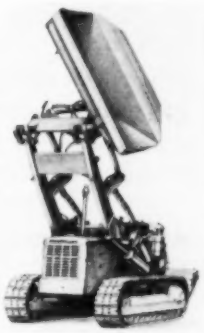
QUICK CHANGE—SPECIAL BUCKETS FOR THE No. 977 TRAXCAVATOR



Heavy Material Bucket—for easier penetration of tough materials weighing over 3600 lb. per cu. yd.



Skeleton Rock Bucket—heavy ribbed construction openings for material size selection.

Side Dump Bucket—dumps to left or front. Increases production by eliminating turning to dump.

CATERPILLAR

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BOOST PRODUCTION AND LOWER COSTS WITH A VERSATILE TRAXCAVATOR

filed with the Industrial Commission within one year after the injury or, in case payments have been made on account of the injury, within one year from the date of the last payment. This law also states that the employer shall provide such medical treatment as may reasonably be required by the injured employee.

The testimony showed that an employee, named Igoe, was seriously injured while he was finishing the top of a retaining wall. He slipped and fell on the top of the wall, which his employer, the S. Block Company, had contracted to construct from concrete blocks.

The employee failed to file an application for compensation within a year from the date of his injury. The lower court refused to award Igoe any compensation. Igoe appealed to the higher court claiming that the above mentioned state law was not applicable because medical treatment was not furnished by his employer until more than one year after he was injured.

The higher court held that such delayed medical treatment did not revive Igoe's cause of action. The court said:

"In construing any statute courts will give it a reasonable, rather than an unreasonable interpretation. It is reasonable, we think, to conclude the legislature intended to give a claimant one year after his injury and after he knew, or should have known, it was a compensable injury, to start legal proceedings to enforce his claim."

Cannot Prohibit Use of Streets

A few weeks ago a higher court apparently solved a complex legal problem by holding that a municipality cannot prevent use of its streets by motor vehicles.

For instance, in *N. R. Q. Corporation v. Town of L. A.*, 343 Pac. (2d) 155, the testimony disclosed these interesting facts: The N. R. Q. Corporation has owned a rock quarry located in an unincorporated area since 1935. Nine persons are employed. Its equipment is valued in excess of $250,000.00. The quarry is not operated on weekends. A water truck is used to wet down the roads and quarry property near a town.

The only roads to the quarry are through the town on streets which have been used since 1935 for the transportation of materials to the quarry property. To get to and from the quarry, trucks must travel on the town streets for approximately one mile.

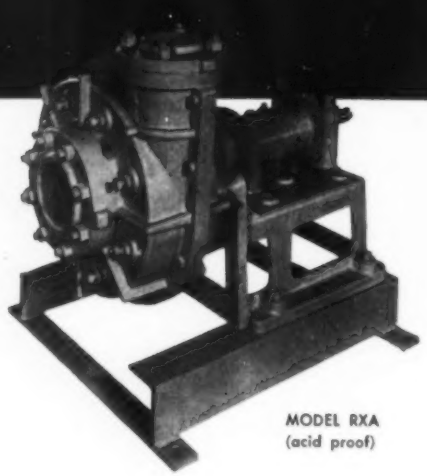
Recently the town passed an ordinance which prohibits operation of any motor truck on its streets which has a maximum gross weight of over 12 tons (24,000 lb.). Certain trucks are accepted as those delivering materials to be used in the actual and bona fide repair, alteration or construction of any building or structure for which a building permit has been previously obtained. However, the ordinance clearly prohibits the N. R. Q. Corporation from using the streets in the town for travel of its trucks weighing gross over 12 tons.

It is interesting to observe that the higher court held this ordinance invalid and unenforceable, saying:

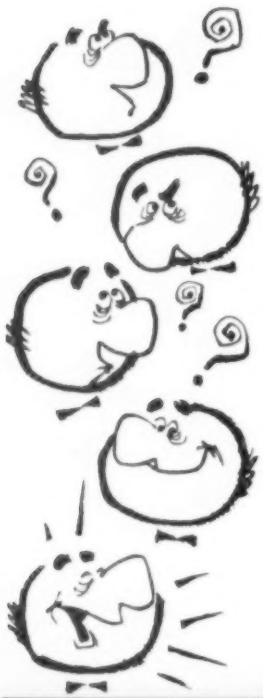
"The ordinance here is unreasonable. In these days of the universal

NEW!

PERFORMANCE-PROVED CERAMIC-LINED SAND PUMP



MODEL RXA (acid proof)



ARE YOU USING pumps for transferring fines? Is the volume in the range of 110′ head-150 GPM to 70′ head-600 GPM?

ARE YOU TIRED of replacing impellers, liners, shells, sleeves, seals, bearings, shafts, bolts, nuts, gaskets, etc., every few months?

ARE YOU WISHING someone would produce a pump worthy of your expectations? Something that would hold up for say — 14 months? 18 months? 2 years!

YOU WILL FIND the ultimate in wear resistance in ceramic lined pumps using silicon nitride bonded silicon carbide wear parts.

SOUND EXPENSIVE? Not at all. Cost is comparable to alloyed iron or rubber lined pumps.

For additional information on the new MODEL RXA Ceramic-Lined Sand Pump, write:

The KANSAS CITY HAY PRESS COMPANY
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straight line to drilling profits

MISSION HAMMERDRIL A straight line, even in crooked hole country, means faster drilling. This bottom hole impact tool is not subject to hole deviation as other methods of drilling are. Straighter drilling and faster drilling mean more jobs and a bigger chance of success.

The fewer parts that move, the less chance for trouble. There are only two moving parts in the high pressure Hammerdril® and only three in the low pressure. Impact parts are heat-treated high alloy steel; moving parts are friction and wear resistant.

You can begin now to use the Mission Hammerdril on your present rotary rig simply by adding suitable air compressor capacity. You can begin now to cut the cost per foot of drilling through hard rock and still do that drilling better. And best, you can **re-sharpen** the massive tungsten carbide inserts in the Hammerbit® **in the field.** These inserts give maximum cutting efficiency and straight, full gauge hole.

The Mission Hammerdril is sold and serviced throughout the United States. Write for actual field savings under field conditions being realized by present Hammerdril users.

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use of trucks for transportation of materials of all kinds, no city may close all its streets to trucks of capacities that are in daily use in commerce. It would be unreasonable for a municipality to bar from its streets heavier trucks in common use. It is a municipality's obligation to provide for reasonable use of its streets by vehicles generally, including heavy trucks."

With respect to the argument presented by the officials of the town that the N.R.Q. Corporation could build their own roads if they were to purchase about three miles of private property between their land and the nearest road other than the town streets, the court said:

"There is no authority for the proposition that an alternate route must be constructed by the quarry owners off their own land."

For comparison, see *McCammon v. City of Redwood*. Cal. App. 308 P. (2d) 831. This court upheld the validity of an ordinance which limited trucks over a certain weight to the use of certain streets. However, this ordinance designated alternate routes within the city for such vehicles. Otherwise the ordinance would be unreasonable and void.

Court Grants Injunction

A few weeks ago I located an important outstanding higher court decision, decided by the Supreme Court of Nevada, which held that if a labor union does any act designed to force the operator of a business, or a contractor, to sign an agreement to hire only union employees, such agreement is illegal.

For illustration, in *Building Trades Council v. Bon*, 280 Pac. (2d) 295, the testimony showed that a contractor named Bon was placed on the "We Do Not Patronize List," published and issued by a union after Bon unsatisfactorily acted from the point of view of the labor organizations while he was doing construction work. Bon sued the union and asked the court for an injunction.

During the trial Bon proved, among other things, that he sought to have an electric neon sign manufactured and placed on the property to advertise a business. He testified that none of the companies engaged in such business would manufacture and erect the sign, advising him that

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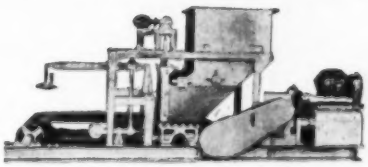

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he was on the "We Do Not Patronize List."

The higher court granted an injunction against the union, saying:

"The unlawfulness of an agreement 'which excludes any person from employment' because of non-union membership cannot by construction or interpretation be read to mean that the unlawfulness is cured or waived. . ."

Purchase of Defective Equipment Delays Complaint

Recently I received an interesting letter from a reader, in part, as follows: "For many years I have cut your writings from PIT AND QUARRY and placed them in a book under indexes so I can refer to a certain law when a problem arises. Yesterday I re-read your cases in which you explained in the past that if a purchaser finds that machinery, or other merchandise, is defective he must complain at once to the seller and ask him to cancel the contract and refund the purchase price. My question is whether I did the right thing recently when I took the seller's advice and kept defective machinery to try to make it work satisfactorily?"

The answer to this question is in the affirmative.

The law is established that, under ordinary circumstances, a purchaser of imperfect, defective or unsatisfactory machinery or equipment cannot be compelled by the seller to keep and pay for it. However, generally the dissatisfied purchaser should promptly complain to the seller and return the defective or unsatisfactory equipment or other merchandise to the seller. According to a leading higher court decision there is one exception to this general rule of the law. This exception is when the seller or his salesman suggests that the purchaser continue to test and use the unsatisfactory equipment.

For illustration, in *C. v. Smith*, 28 So. (2d) 657, the testimony showed facts, as follows: A man named Smith purchased six lime spreaders. For some time the manufacturer's agent stayed with the purchaser in order to service and properly adjust the machines. The testimony showed that certain gears on the spreaders broke; the fan chain broke; and also the universal joints tended to break.

The purchaser wanted the seller to take back the spreaders at once, but the manufacturer's salesman suggested that Smith continue to make tests and trials of the machines.

Later the manufacturer contended that Smith was obligated to keep and pay for the machines because he kept them for over two months without making any further effort to return them.

The jury court held that the manufacturer must take back the spreaders, and that Smith need not pay for them. The higher court approved the verdict, saying:

"The evidence seems to be clear that this particular equipment was not efficient in its operation or mechanically sound in its construction. . . The jury had the right and duty of judging between the testimony of the various witnesses, and by its verdict adopted the testimony on behalf of appellee (Smith) that the retention of this equipment by appellee (Smith) was done at the instance and request of appellants (manufacturer)."

For comparison see *Alig. v. Lackey*, 75 So. 139, 140. This court held that the buyer will be regarded as having made a legal acceptance of defective equipment if the testimony shows that the buyer prolongs the trial or test of the defective equipment beyond a reasonable period, or used it longer than is fairly and reasonably necessary in making the test.

Not Liable for Technical Breach

In the past the law has been fairly well established that anyone who breaches a contract is liable in damages to the other contracting party. A few weeks ago a higher court modified this usual law.

For instance, in *R. M. Company v. N.*, 264 Fed. (2d) 807, the testimony showed facts, as follows: A general contractor named N. signed a contract for the construction of certain facilities at an Air Force base which included laying of concrete runways.

A certain D. Company acted as a sub-contractor and agreed to furnish N. certain paving materials known as "aggregate." This subcontract contained a clause to the effect that the D. G. C. Co. should obtain the materials from the "Graumann lease." Thereafter, the R. M. Company contracted with N. to furnish other paving materials. This subcon-

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tract provided that the R. M. Company had the option to furnish all materials which the D. Company "may not be able to produce under its contract."

Later the D. Company, in order to continue performance under the contract, abandoned the Graumann lease and furnished the required materials from other locations.

The R. M. Company sued N. for heavy damages claiming that he had breached his contract by accepting materials from the D. Company which were not obtained from the Graumann lease. The officials of the R. M. Company contended that if N. had complied with the terms of his contract with the D. Company, it, the R. M. Company, would have sold N. a considerable quantity of material, at a good profit.

It is interesting to observe that the higher court held that the R. M. Company could recover no damages from N. because the latter had not committed a "breach" of the contract by allowing the D. Company to supply similar materials not taken from the Graumann lease. It said:

"When its contract was executed, R. M. Company did not know of the provision in the D. contract which referred to the place of production. It is conceded that D. Company supplied the materials required by his contract in good faith. The furnishing of materials which satisfied the contract specifications, from locations other than the Graumann lease, was, at the most, no more than a technical variance from the specific terms of the contract, and was not detrimental to N."

The higher court went on to explain that if two parties make a contract, these parties can at their convenience mutually change or vary the obligations assumed under the contract. This higher court also explained that third parties have no legal right to dictate or otherwise object to such changes or variations unless the testimony clearly discloses that the third party assumed certain obligations based upon the contents of the original contract between the two contracting parties who also had knowledge of the third party's assumed obligations.

Court Dissolves Corporation

A few days ago I received an interesting letter from an official of a corporation engaged in manufacturing concrete bricks and blocks. This letter read, in part, as follows:

"Where differences between two equally divided factions in a corporation are irreconcilable and the dissensions between them incurable whereby the continuance of the corporation may be unprofitable to shareholders, what legal procedure is necessary to dissolve the corporation?"

The higher court in the leading case of *F. v. H.*, 47 N. W. (2d) 424, answered this legal question. Here the testimony showed facts as follows: A corporation was engaged in the production and sale of concrete blocks, since April 1, 1922. The corporation had 282 shares of stock issued and outstanding, of which one F. owns 141 shares and one H. owns 141 shares. These holdings represent the entire stock of the corporation. The corporation also owned two subsidiary corporations.

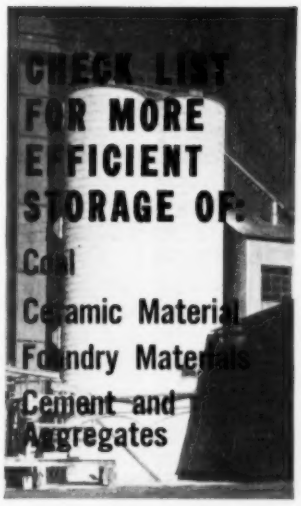
F. filed suit and asked the court to dissolve the corporation on the grounds that the business of the corporation could no longer be conducted with advantage to either stockholder because there was internal dissension. It was further contended that the president of the corporation has been guilty of mismanagement, abuse of authority, and although the corporation is solvent and has prospered financially from its operations in the past, depletion of its assets and irreparable damage will result if the corporation's business is carried on.

The higher court held that these matters justified dissolution of the corporation, saying:

"Where differences between two equally divided factions in a corporation are irreconcilable and the dissensions between them incurable so as to make the continuance of the corporation unprofitable to its shareholders, the court is expressly given the power and discretion to dissolve the corporation on that ground alone."

Can Make Repairs Only

A manufacturer of concrete blocks wants to know whether or not he can add to and repair his plant, which was in operation before a recent city ordinance was enacted to restrict this area exclusively for residence.



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The answer is: You may make the necessary repairs, but you may not construct additions to your plant.

For example, in *Granger v. W. V. Company,* 44 N. W. (2d) 399, the testimony showed that a company applied for a permit to repair a building which had been used since 1937 for the manufacture of concrete burial vaults.

The higher court held that as the building had been used for industrial purposes when a new zoning ordinance was passed, which restricted the area for residences, the city must issue a permit for repairs to the building. However, no new additions to the plant can be made. The court said:

"Under the guise of zoning, arbitary and unreasonable restrictions upon the use of property prohibition or deprivation of property without due process of law may not be made. Zoning being an exercise of police power by the municipality, such delegated power must be strictly construed."

This court went on to explain that the buildings on the premises cannot be enlarged or otherwise remodeled to increase the extent of the present business, but that a zoning ordinance is not valid which restricts or otherwise prevents or interferes with present continued use of the property.

Seller Not Obligated

Considerable discussion has arisen from time to time over the legal question: Is a seller of material liable to a general contractor for failure to supply materials specified by the property owner?

According to a late higher court decision, the answer is no, if the testimony proves that the seller did not agree to supply material to the contractor equal to the quality specified in the contract between the contractor and the property owner.

In other words, under no circumstances is an agreement between a contractor and a seller of materials varied by another contract between the contractor and a third party unless the seller agreed to comply with its terms

For example, in *K. S. & G. Company v. Willis,* 260 N. W. 54, the testimony showed that a sand and gravel company contracted to sell gravel to a contractor, who had made another contract with a property owner to perform certain construction work and use gravel of a specified quality. The contract between the contractor and the material seller contained no specification clause of this kind. Later, tests were made for the property owner of the gravel delivered by the seller to the contractor. The inspector held that the gravel did not comply with the specifications in the contract between the contractor and the property owner and rejected the same.

In subsequent litigation, the contractor contended that he was not obligated to pay for the rejected gravel because it did not equal the quality in the specifications, and also because the seller had impliedly agreed to deliver a quality of gravel that would comply with the specifications.

As the contractor did not prove that the sand and gravel company had agreed to supply gravel equal to to the quality specified in the contractor's specifications, the higher

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court held the company entitled to recover full payment from the contractor, saying:

"The contract between the plaintiff (company) and the defendant (contractor) was wholly independent. . . It is our conclusion, therefore, that the contract between the property owner and the defendant (contractor) was wholly immaterial."

Law Not Strictly Construed

A reader asked: "Do the courts strictly construe state laws involving payments of compensation to employees who contracted the disease of silicosis?"

A leading higher court has held that although it will not vary the clear meaning of a state compensation law, yet it may "add to" an incomplete or ambiguous law.

For example, in *Kuntz v. A. S. Company*, 40 Atl. (2d) 864, it was disclosed that a state law provides that disability or death of an employee, caused by silicosis, anthracosilicosis, or asbestosis, shall be paid jointly by the employer and the state if the testimony shows that the disease "developed 5 years before the employee's application was filed."

An employee became totally disabled by silicosis which he contracted in a quarry and sand crushing plant. The testimony showed that he had worked in the plant almost but not quite 5 years before he became disabled.

The higher court held that the employer must pay full compensation, saying:

"We have no doubt that the legislature intended that the Commonwealth should be liable for a portion of an award for compensation in a silicosis case only when it developed after an exposure of five or more years."

Obituaries

ALBERT W. BUSCH, 76, retired superintendent of the Kelley Island Corporation's plant near Buffalo, N. Y., died recently in Stuart, Fla., after a brief illness. (Kelley Island is a division of Basic, Inc., Cleveland, Ohio.)

WALTER W. KINGINGER, 78, a retired vice-president and director of the Diamond Portland Cement Company (Middle Branch, Ohio), died during January in Canton, Ohio, after a long illness. He was associated with Diamond since 1915; prior to that, he had been employed by various cement firms in the United States and the British Isles. He retired in 1945.

FRANK J. WHITMAN, 63, central sales manager for the Universal Atlas Cement Division, United States Steel Corporation, died recently as the result of a heart attack at his office in Chicago. Mr. Whitman joined Universal Atlas in 1918; He was named Chicago sales manager in 1947 and in January, 1958, he became central region sales manager.

B. A. MACDONALD, 76, retired vice-president and assistant general manager of the Northwestern States Portland Cement Company (Mason City, Iowa), died recently in Mason City. He had been with the firm for 35 years at the time of his retirement in 1954.

ANGELO N. LEVERONE, 72, president and treasurer of the Ashland Sand and Gravel Company, Ashland, Mass., died recently in a Framingham, Mass., hospital. He was a member of the New England Road Builders Association and Massachusetts Concrete Institute.

ROY L. MCNEELY, 56, president of McNeely Stone Company and McNeely Quarries, Inc., both of Ellettsville, Ind., died recently in a Bloomington (Ind.) hospital after a brief illness.

VERNE R. BRITTON, 70, owner and operator of Dry Island Sand and Gravel Pit, Mishawaka, Ind., died recently in Veterans Administration Hospital, Hines, Ill. He had operated the business since 1924.

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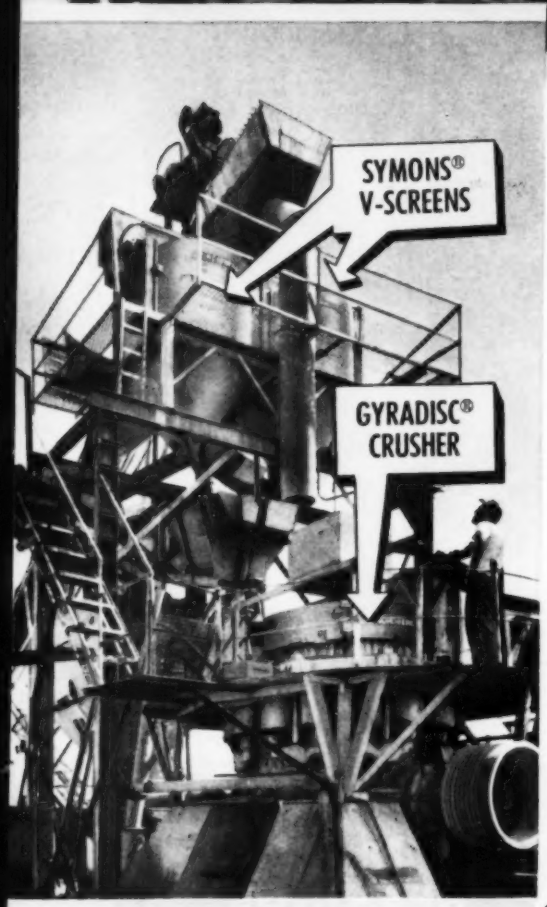
How to profitably MOVE A MOUNTAIN of "unsalable" torpedo gravel



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At present, the Gyradisc Crusher and the two Symons V-Screens handle a daily production of up to 500 tpd on intermittent operation.

In many operations, Gyradisc® Crushers supplement Symons® Cone Crushers for volume production of fine specification material. They are used for the production of agricultural limestone, limestone chips, sand, rock dust, crushed stone for asphalt mix and the fine reduction of asbestos, slag, talc, etc.

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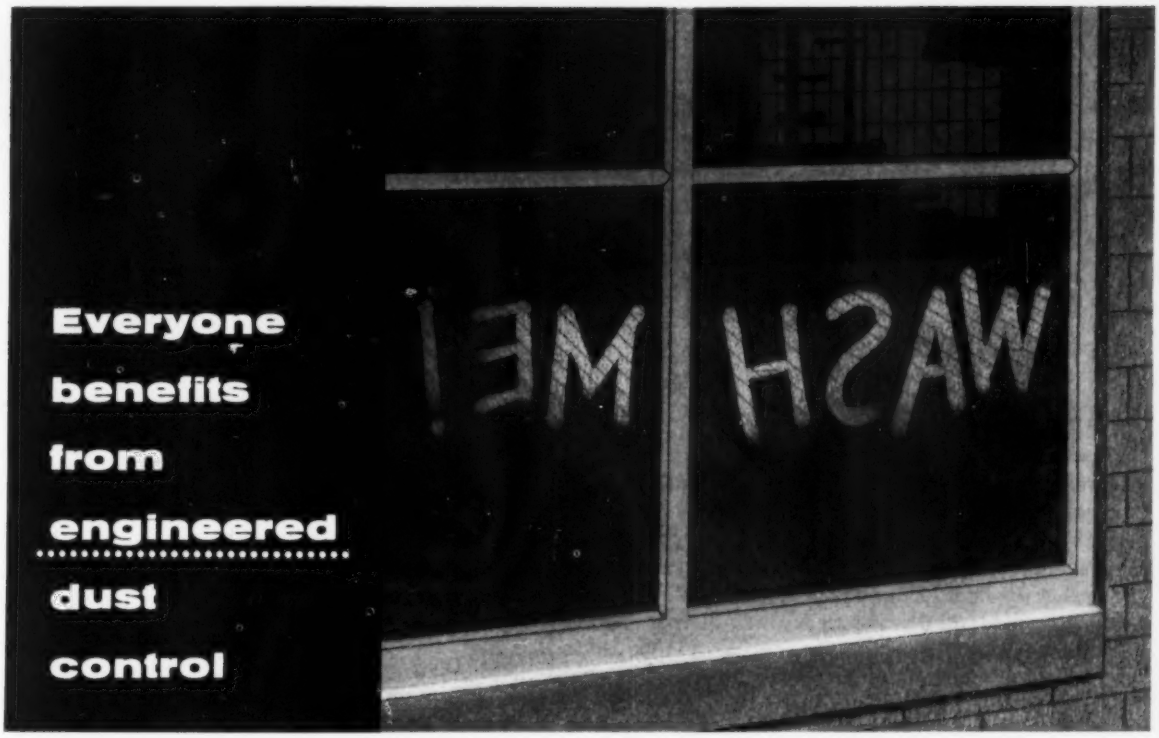

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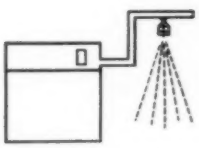
Johnson-March by specializing in dust control engineering has become the leader in the field.

Johnson-March engineers can show you how your dust control problem can be solved at low cost. Ask your consulting engineer or write to Johnson-March Corporation, 3018 Market Street, Philadelphia 4, Pa.

JOHNSON MARCH | **dust control engineers**

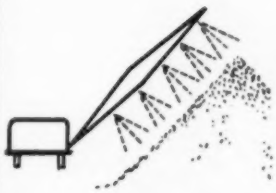
now—new low prices



J-M Chem-Jet—Systems engineered to control dust at the source in bulk materials handling.

J-M Scrubbers—guaranteed 99% efficient in removing dust, fumes, odors.

J-M Verticone—for dust-free unloading from bins and silos; for the process application of liquids to solids.



J-M Compound S-P—prevents costly windage loss of materials stockpiled outdoors.

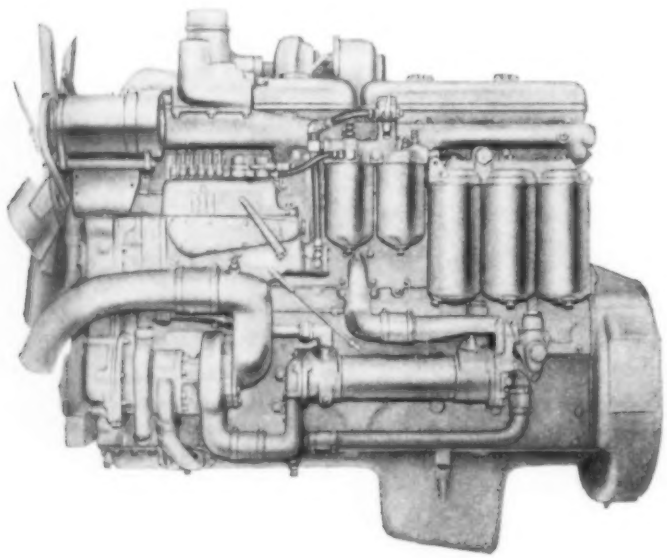
How BRAWN-BACKED Payscraper® features give you stepped up...loading

From power plant to push-block, the 34-cu. yd. International 295 Payscraper gives you an exclusive combination of features that step up dirt-on-fill delivery! Compare quiet, big-capacity DT-817 Payscraper power. Try the advantage of up or down, on-the-go, Payscraper power-shifting that provides load-speeding *automatic* direct-drive lock-ups in second, third, and fourth gears! Measure *extra value features* like safe, effortless power-steering—that leaves "the steering feel in the steering wheel." Note how exclusive torque-cushioning planetary drive axles add dependability to rough-and-tumble earthmoving! See how 122-inch bowl width speeds loading and unloading—adds control ease and stability, loaded or empty. Prove on your job that bonus performance "rides" the Payscraper bowl. Choose the 2-axle "295"; or 3-axle, 34-cu. yd. "495." See your International Construction Equipment Distributor for a demonstration.

...roading

Payscraper power-to-payload punch tops all other rubber-tired rigs—because the fast-slugging, high-torque International DT-817 diesel is the Payscraper power plant! The 375-hp, turbocharged DT-817 gives you direct, push-button starting; all-altitude high-efficiency performance; power for top rim-pull to help speed all steps of the cycle; time-saving "no-lag" control power!

...dirt-on-fill capacity!



Even "dead" sand comes alive and "boils" fast into the Payscraper bowl. Every detail of Payscraper design aims at speeding the cycle, and *staying available!* The 21-inch diameter steel cross tube provides super load-bearing strength and resistance to impact. Bowl "backbone," draft arms and side reinforcing members all are massive high-strength box-section steel weldments. "X"-member reinforcing maintains perfect push-frame alignment at all times. And the 4-speed, planetary-type, torque-converter power-shift transmission automatically adjusts torque and load to speed — to maintain full capacity!

You steer the 140,000-lb. loaded Payscraper almost as easily as a 3,600-lb. automobile! Payscraper gives the big control advantages of (1) exclusive International rack-and-pinion plus tandem pump steering system; and (2) 3-degree forward spindle pitch that improves scraper balance and prevents "nose downs" in high-speed turns. The 16-adjustment, bump-smothering seat builds operator confidence, too. And reach-easy power brakes, "control tower" vision, and flush deck safety help him deliver full Payscraper capacity, and take advantage of speeds up to 33.5 mph. He commands ample power and traction to pull *directly* out of 90-degree turns, even on soft fills!

The fast, positive-acting Payscraper ejector mechanism is powered by the International PTO-driven Cable Control Unit. One cable drum of this simple planetary system actuates the apron and ejector; the other drum positions the bowl to control spreading action. Apron lifts to a big 94-inch opening. Two ejector-plate pushing members apply dozer-like action to force out the whole 34-cu. yd. load cleanly. Action of six heavy-duty springs, stretched during ejection, positively powers the ejection mechanism's return!

Here's your 76-page cost and production estimating book— newest, most authentic and complete guide for estimating material-moving costs—and for selecting equipment combinations for top profits, *anywhere!* Yours for the asking from your International Construction Equipment Distributor!

International Harvester Co., 180 N. Michigan Ave. Chicago 1, Illinois
A Complete Power Package

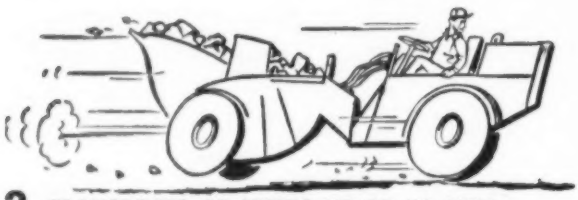
International® Construction Equipment

Enter 222 on card, page 233

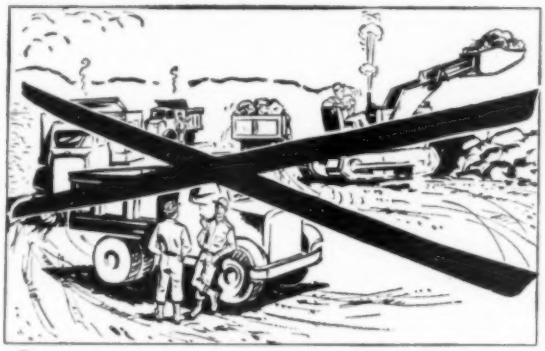
Why TRANSLOADER?

The Only Self-Loading Transport!

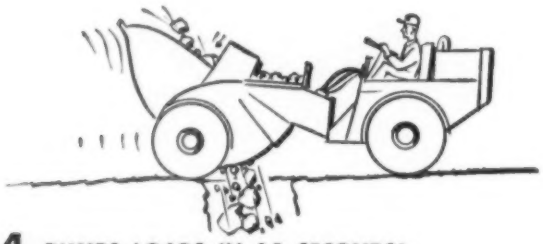
1. LOADS 6 TONS IN 49½ SECONDS!



2. TRANSPORTS AT SPEEDS UP TO 23 MPH — *either direction!*



3. NEVER WAITS ON OTHER EQUIPMENT! S-D Transloader saves labor and machine costs wasted in multiple machine operation.



4. DUMPS LOADS IN 15 SECONDS!

5. NO TURNAROUNDS REQUIRED! Returns immediately to reload! Travels at higher speeds than other equipment because of low center of gravity and articulated steering!

THIS IS WHY the S-D Transloader is more efficient than conventional equipment and methods of materials handling. But this is not all. The S-D Transloader way is the **lowest possible cost way** because:

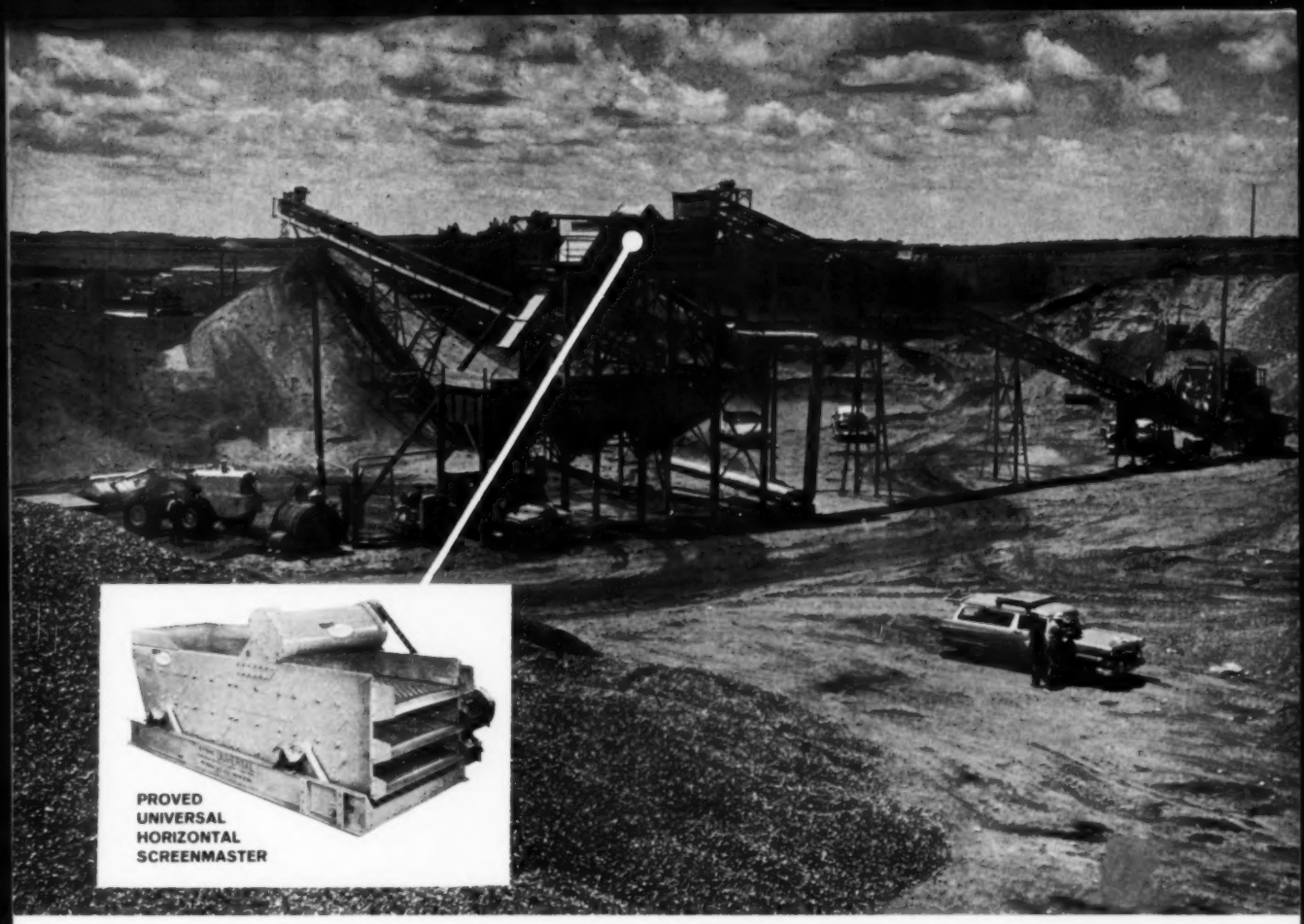
1. **LOWEST ORIGINAL COST** for tons handled!
2. **LOWEST MAINTENANCE** due to extremely simple design and high quality of components . . . such as T-1 Steel, Cummings Engines, Clark Axles, Allison Transmissions!
3. **LEAST VENTILATION** required underground due to low horsepower ratio to work-done!
4. **LOWEST LABOR COST PER TON!** Incentive systems fit the S-D Transloader like a glove because of solo operation! Nothing could be neater than an operator loading and running a known distance to discharge **by himself!** This RELEASES SUPERVISION! S-D Transloader also ELIMINATES TASK OF TRYING TO BALANCE MEN AND EQUIPMENT WITH CONSTANTLY CHANGING SITUATIONS!

Write us today for Complete Packet of illustrated literature, data and time studies on this remarkable machine —

THE ONLY SELF-LOADING TRANSPORT! Sanford-Day Iron Works, Inc., Dale Avenue, Knoxville, Tennessee. Telephone: 3-4191

SANFORD-DAY

KNOXVILLE, TENNESSEE



Universal's Screenmaster working in the Barton Construction Co. pit near Rosemont, Minn. As a result of its outstanding performance in sizing material for their various paving jobs, Barton recently purchased a Universal Portable Crushing Plant equipped with a Universal Low-Boy Screenmaster.

FLOATS ON AIR AND RUBBER . . . A SUPERIOR PERFORMER EVEN IN DAMP OR WET MATERIAL

A proved combination of air springs and rubber-bushed phasing bars has made Universal's Screenmaster the standard for profitable production. Owners and those who have seen it in action call it the most efficient screen developed in years.

Eliminates Leaf and Coil Springs

The Screenmaster floats on air and rubber. Gone completely are the old metal leaf and coil springs. And with them. . . their destructive violence. . . their unpredictable reaction to loads . . . their unnecessary wear on basket and cloth. . . their high cost of continuous replacement!

Its exclusive features combine to give the Screenmaster the most aggressive screening, the most positive separation, the lowest maintenance and the greatest capacities ever.

The screen, with its exclusive air springs and rubber-bushed phasing bars, acts as a single unit, transmits smooth, sharp and aggressive action over the entire screening area. *The air springs* replace conventional coil springs . . . cushion and absorb shock while *the phasing bars* control the screen, eliminate the destructive, corner to corner violence of ordinary screens.

Snappy aggressiveness produced by this exclusive combination, prevents blinding, blanketing or squatting. . . cuts through wet or damp material quickly — resulting in greater capacity and higher profit. The Universal Screenmaster also gives you more screening area. Its rugged feed box absorbs and distributes material over full width of screen deck; a precision engineered power unit gives you long trouble-free life.

Put this profit-making Universal Screenmaster to work for you. There's a size for every requirement. Your Universal Distributor can help select the best for your operation whether stationary or portable.

PETTIBONE
UNIVERSAL
In Cedar Rapids Since 1906

UNIVERSAL ENGINEERING CORPORATION

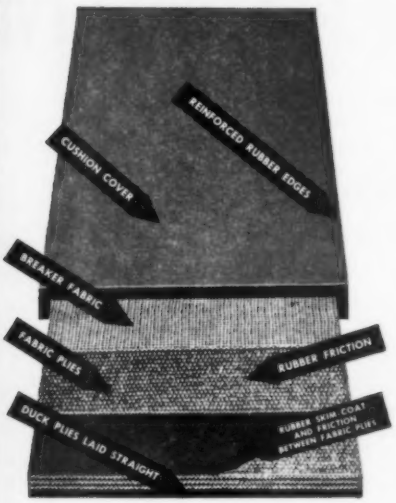
619 C Avenue N.W., Cedar Rapids, Iowa

Subsidiary of Pettibone Mulliken Corporation, 4700 W. Division Street, Chicago 51, Illinois

Going up --- new highways, bridges and buildings

300 tph of aggregate goes up on the Acme-Hamilton conveyor belt to the concrete mixing plant . . . and from there to the hundreds of construction jobs served by the Parkway Concrete Co., Trenton, N. J. "This Barber-Greene Conveyor and Acme-Hamilton belt have given me better service than any other I have used" says Frank Talarowski Parkway's general manager.

BETTER SERVICE at lower cost is assured when you make sure your belting is Acme-Hamilton. Whatever your conveying problem, A-H can solve it with a proven belt from its complete line, that will do a "Custom built" job for you. For a complete explanation of A-H belt construction and types, write for our "check-your-belt" Catalog.



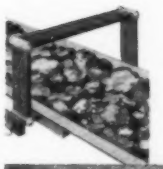
Acme Hamilton

Serving Industry Since 1870

MANUFACTURING CORPORATION, TRENTON 3, N. J.

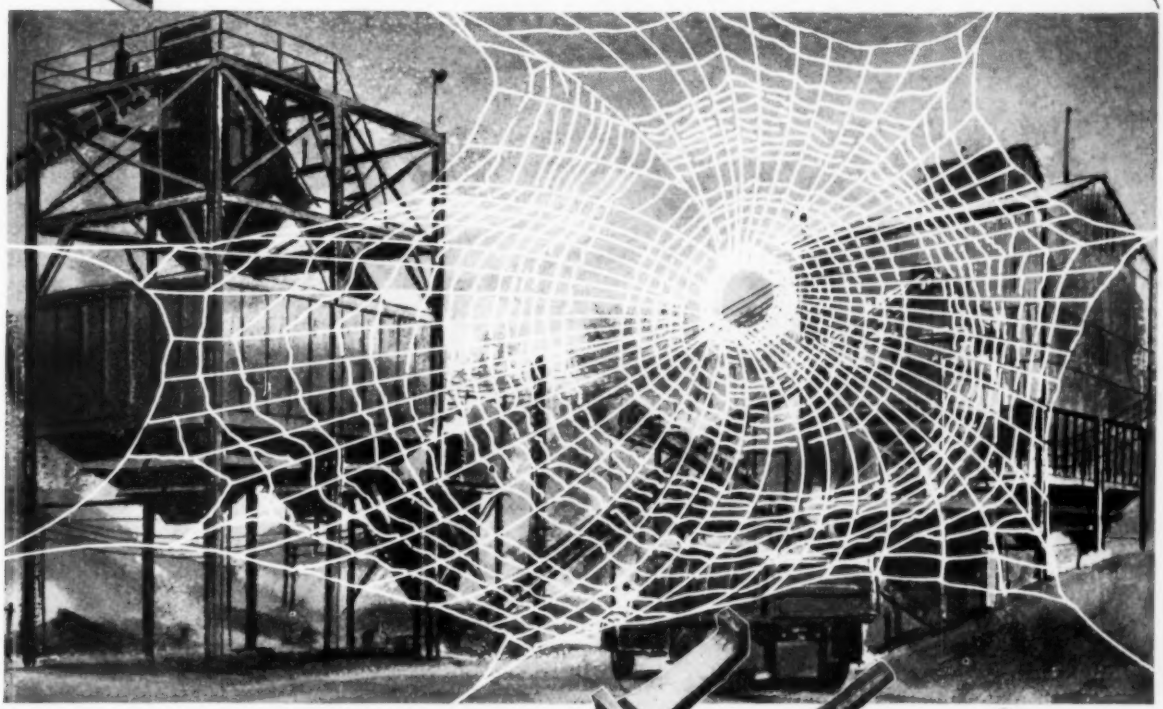
Divisions: Acme Rubber Mfg. Co. • Hamilton Rubber Mfg. Corp.

ATLANTA · CHICAGO · DETROIT · HOUSTON · INDIANAPOLIS · LOS ANGELES · MILWAUKEE · NEW YORK · PITTSBURGH · SALT LAKE CITY · SAN FRANCISCO · SEATTLE



...GATEWAY TO SAFETY FROM TRAMP METAL

ANOTHER WAY RCA SERVES INDUSTRY THROUGH ELECTRONICS



Avoid crusher shutdowns due to tramp metal ... with an RCA METAL DETECTOR!

Shutdowns caused by tramp metal—steel bolts, rods, hand tools, dipper tooth fragments—can be virtually eliminated once you install an RCA Electronic Metal Detector. As one well-known producer of crushed stone writes: "*The RCA Metal Detector has cut down-time to the absolute minimum and this means that we save on both parts and labor.* It does a good, thorough job."

The RCA Metal Detector is designed to withstand heavy-duty service, dust and moisture. Available in a wide range of sizes, it is easily and quickly installed over existing conveyor lines. Rugged components and built-in voltage regulator provide efficient, trouble-free operation. Both magnetic and non-magnetic metals are readily detected. As the material passes through the aperture, the presence of tramp metal triggers the Metal Detector, which can be set up to stop the conveyor, or actuate a horn or reject mechanism.

The RCA Service Company will provide installation supervision and service if desired.

Find out more about the RCA Electronic Metal Detector and how it can save you money. Write to RCA, Dept. G-236, Building 15-1, Camden, N.J., and we'll rush details.

RCA

Tmk(s) ®

RADIO CORPORATION of AMERICA

CAMDEN, N. J.

In Canada: RCA VICTOR Company Limited, Montreal

RCA ELECTRONIC METAL DETECTOR

FROM THE BRITTLE COLD OF MINNESOTA'S MESABI RANGE
TO THE SOFTENING HEAT OF FLORIDA'S PHOSPHATE MINES—

Anaconda's new all-butyl Shovel Cable passes every life test

Heat, cold, kinks, even runovers and rock falls couldn't knock out this new shovel cable during months and months of torture-testing around the country.

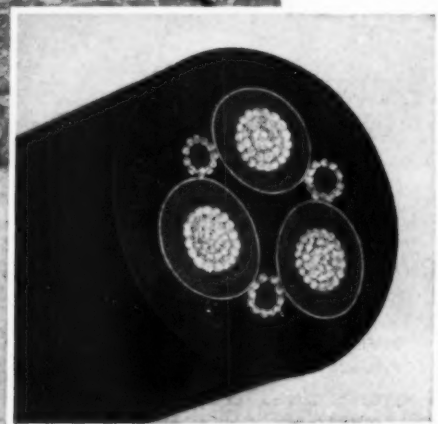
That's because its new all-butyl *insulation* and *jacket* make it the toughest shovel cable you can buy. And—one of the most economical over the long haul. Anaconda's new process butyl—as an insulation—has proved its ability to take pinching, crushing and the effects of moisture and ozone in many fields—from extra-high-voltage power cable to surface mining. And now it's available to you as a *jacket* in Anaconda's new shovel-cable construction.

Because of its superb service record, the inner construction of this new cable remains the same. For example, you still get Anaconda's patented rubber-core grounding conductors which minimize wire breaking and offer greater ground protection. Also included are special shields of copper cross-braided with cotton—a construction which makes the braided shield lie flatter and eliminates chafing. In addition, this feature makes for much easier and faster splicing. Both electrically and mechanically, Anaconda shields are superior to all-metal construction.

Only Anaconda offers you this job-tested shovel cable with all these construction extras in a proven design. Add up the features—they mean extra cable life and dollar savings.

So, call the Man from Anaconda and ask him about the new Anaconda all-butyl Shovel Cable. Or write: The Anaconda Wire & Cable Co., 25 Broadway, New York 4, N. Y.

60258



ASK THE MAN FROM

ANACONDA®

ABOUT THE ALL-BUTYL SHOVEL CABLE

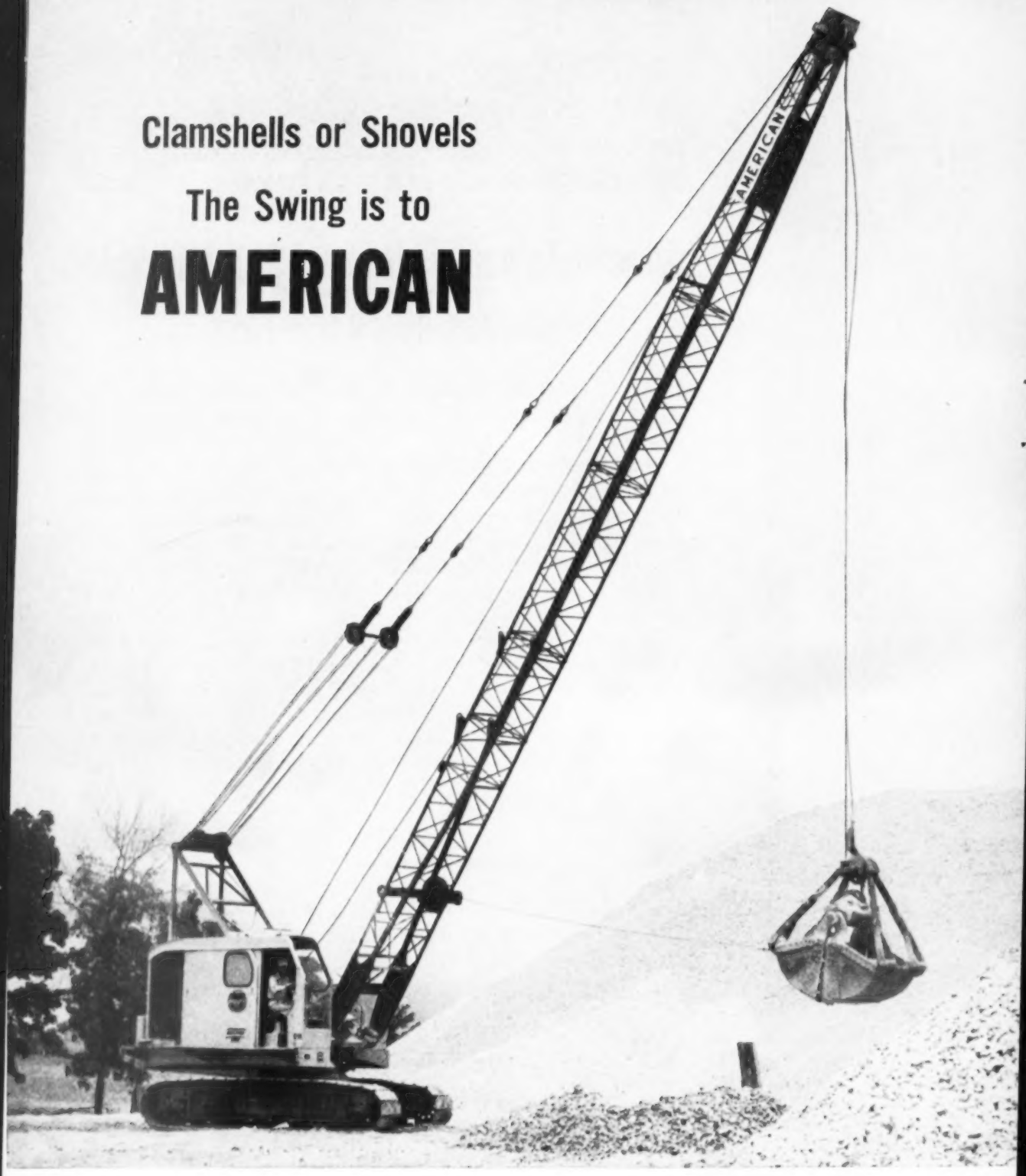
Another New Product From Anaconda's Rubber Cable Center

Note the heavy-duty weather-resistant butyl jacket—the rubber core grounding wires—also see how the ground wires make constant contact with conductor shields.

Clamshells or Shovels

The Swing is to

AMERICAN



Contact your American Distributor about the full line of Heavy Duty, Pit-Proven equipment.

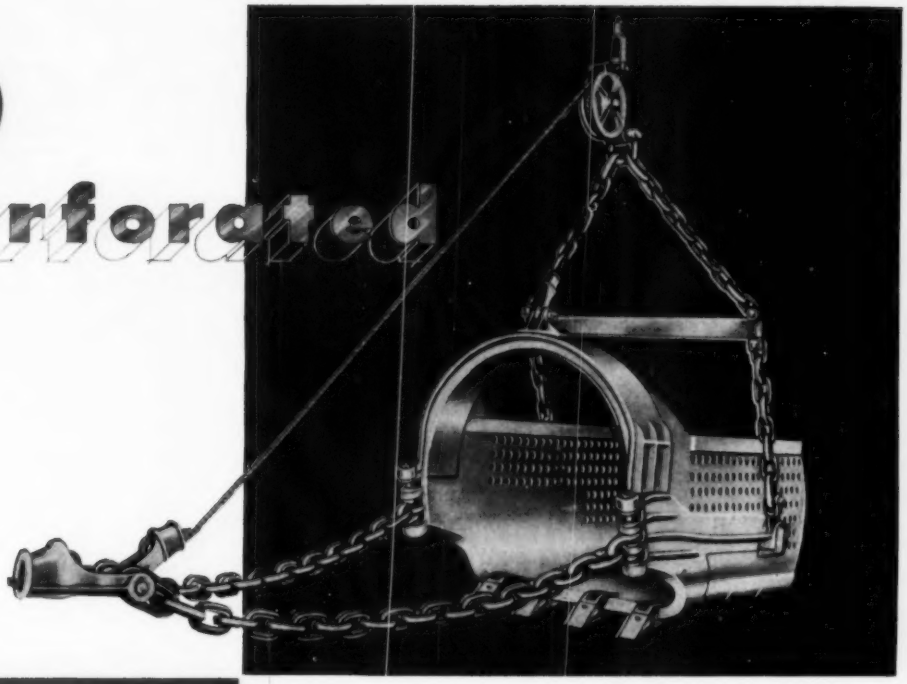
AMERICAN HOIST
and Derrick Company
St. Paul 7, Minnesota

EXCAVATORS-CRANES
to 2 yds.-60 tons
LOCOMOTIVE CRANES
to 130 tons

DERRICKS-HOISTS
to 800 tons
REVOLVER CRANES
to 400 tons

CROSBY-LAUGHLIN
DIVISION
Forged fittings
for wire rope-chain

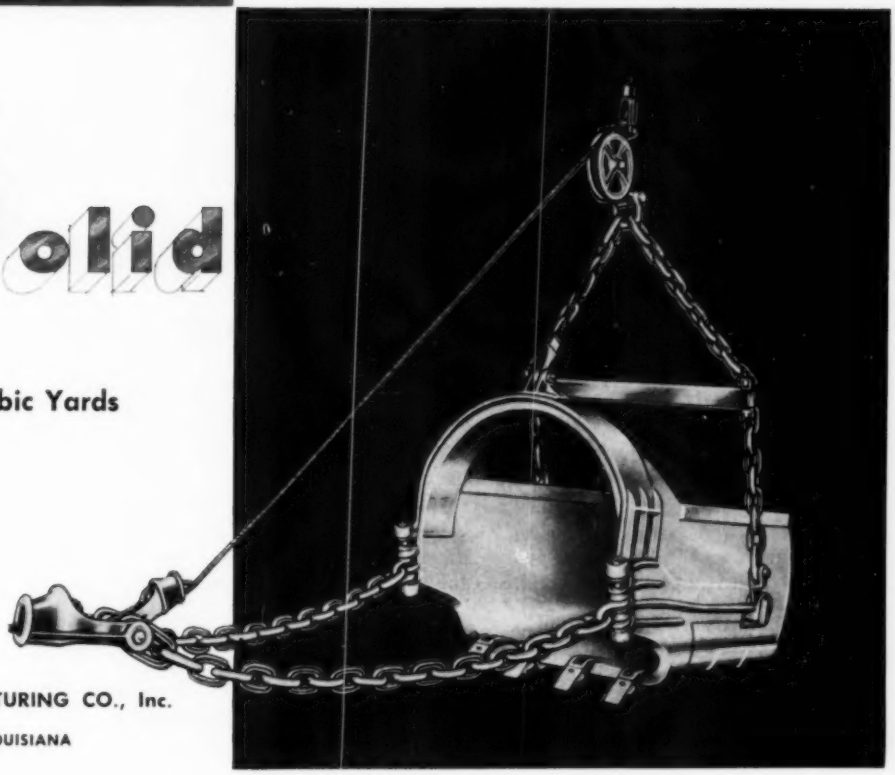
Perforated



HENDRIX
DRAGLINE BUCKETS

3 types for every digging purpose

Solid

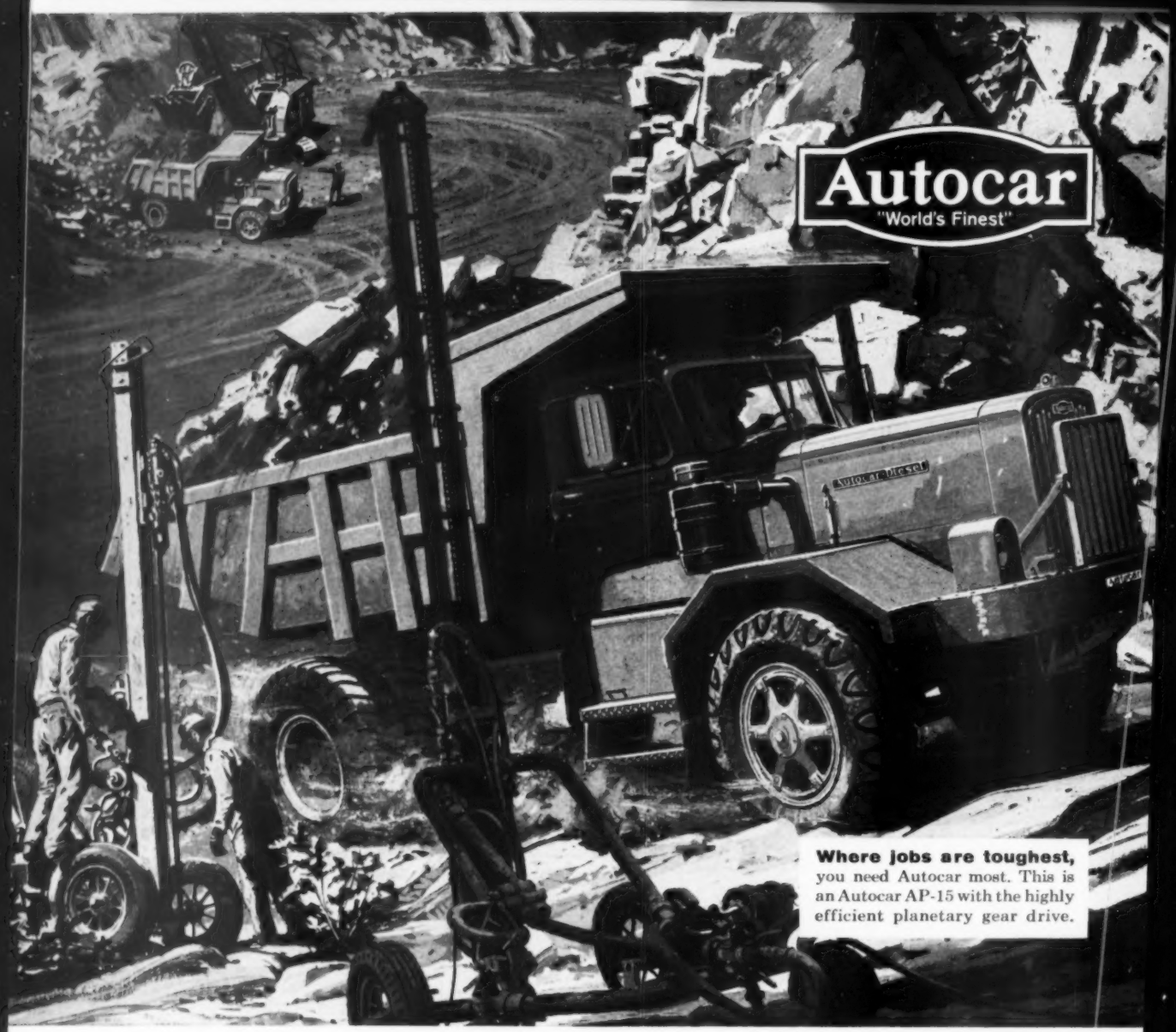


¼ to 40 Cubic Yards

Hendrix Lightweight Dragline Buckets

HENDRIX MANUFACTURING CO., Inc.

MANSFIELD, LOUISIANA



Where jobs are toughest, you need Autocar most. This is an Autocar AP-15 with the highly efficient planetary gear drive.

"Heavy hauling's for Autocar . . . not a substitute"

Need a truck that's versatile, tough under punishment, ready to do any kind of heavy job in any kind of weather? That's the kind of work for an Autocar AP-15.

This Autocar is at home on slippery shale rock; in deep, rutted mud; up grades that look impossible. That's because—with its planetary rear axle—the power is applied with greater gear reduction directly to the rim of the wheel.

Here's a truck plenty tough for anything that comes. It is constructed throughout—from bolted double frame to double-bottom body—to take the heavy shocks and jolts of the day's work.

Each Autocar is custom-engineered to order. Operators agree, Autocar is the "World's Finest." Why try to get along with less? White-Autocar comprehensive service throughout the United States.

Autocar
"World's Finest"

Division of
The White Motor Company
Exton, Pa.

more information, please

Use postcard to receive literature or details on new equipment and products reported in this issue.

"CATERPILLAR PRESENTS THE ALL NEW D4 SERIES C TRACTOR" is a 12-page Caterpillar Tractor Company booklet presenting, by means of diagrams, photos, and specifications, the new 65-hp. tractor with a new engine and a lifetime-lubricated undercarriage. **(301)**

ALL FLUID COUPLINGS in the line manufactured by Twin Disc Clutch Company are described in Bulletin 144-E. The line consists of small cast-aluminum couplings (7.4 to 10.6), and large stamped-steel units (12.2 to 27), for engines and motors ranging from ¾ to 850 hp. **(302)**

CENTRIFUGAL AND TURBINE TYPE PUMPS are pictured and described in a 4-page bulletin released by the Aurora Pump Division of The New York Air Brake Company. The pumps are single- and multiple-stage, flexible and close-coupled, horizontal and vertical, with capacities from 1 to 9,000 g.p.m., and heads to 600 ft. **(303)**

CLAMSHELL AND DRAGLINE BUCKETS AND STONE GRABS made by the Williams Bucket Division of the Wellman Engineering Company are described in a 32-page, 2-color brochure. Photo-diagrams, with accompanying explanations, make clear the features and potential of each type of equipment. The service offered and the guarantee are explained on the last page. **(304)**

AIR POLLUTION CONTROL, provided by scrubbers manufactured by the Air Pollution Control Division of John Wood Company, is explained in a 4-page folder which gives illustrated operating and dimensional data. **(305)**

ASH-HANDLING SYSTEMS for small boiler plants are explained in two data sheets, available from the Allen-Sherman-Hoff Company. One sheet explains a system that will handle 2 to 6 tons of ash per day, and the other describes a steam jet pneumatic ash-handling system. The text of each folder is supplemented by diagrams. **(306)**

AUTOMATIC MATERIAL-LEVEL INDICATORS used to indicate and control the level of pulverized, fine, crushed, or granular material in bins or silos are described in bulletin I-5-C, issued by the Fuller Company. Performance, operation, and current requirements are given for the SG-4 model for general-purpose installations and for the SG-4X for hazardous dust conditions. **(307)**

THE LORAIN 2½ YD. POWER SHOVEL, also available as a crane, clam, dragline, and hoe, is featured in a new 24-page catalog issued by The Thew Shovel Company. Pictures of the 85A at work, and details of the unit's construction are included. The new 10-year warranty on the "Shear-Ball" connection is explained. **(308)**

TIPS ON THE MAINTENANCE OF WIRE ROPE and slings are given in a 28-page booklet published by Union Wire Rope Corporation, subsidiary of Armco Steel Corporation. **(309)**

ENGINES FOR HEAVY-DUTY SERVICE are presented in a Diamond T Motor Truck Company brochure. Photo-diagrams illustrate engine models DT6-170, DT6-185, DT8-207, and DT8-235, and the blocks, crankshafts, and other elements of the engines. A detailed table lists specifications for all four models. Actual horsepower ranges from 170 through 235 at 3,400 r.p.m. **(310)**

← *Enter 232 on card, page 233*

MAY ***PIT AND QUARRY*** ***1960***

Insert key numbers found below items on advertising, literature, and new equipment pages. Print company name if not keyed.

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431 South Dearborn Street
CHICAGO 5, ILL., U.S.A.

more information, please

Use postcard to receive literature or details on new equipment and products reported in this issue.

SELECTION OF FLEXIBLE CUSHION COUPLING made by Dodge Manufacturing Company is simplified by Bulletin A669C, which tabulates the factors involved, and lists suggested coupling sizes. **(311)**

AKINS SPIRAL CLASSIFIERS are covered in the new 28-page catalog (601) published by the Mine and Smelter Supply Company. The principle of operation, construction details, capacities, and suggested plant layouts are explained and given. Applications in open and closed circuit operation, sand preparation, solar salt washing, and phosphate rock recovery are explained. Also included is general information on Akins heavy media separators. **(312)**

PRODUCTION IN EXCESS OF 700 T.P.H. is the claim for the Gravel King, described in an illustrated specification sheet, 539-A, available from Universal Engineering Corporation. Following discharge from the matched jaw crusher, systematized screening with a big scalping screen removes sized material and sand, sending only oversize to the crushing equipment of this portable unit. **(313)**

"A NEW TYPE OF DREDGE FOR SAND AND GRAVEL RECOVERY" is the name of a talk presented by C. G. Cooley, president of the Cooley Gravel Company, at the N. S. G. A. convention in Chicago, and reprinted by Meckum Engineering, Incorporated. In the paper, Mr. Cooley tells the solutions to various problems which arose at his installation when the company explored the use of jet dredge operations. **(314)**

GRINDING RODS are described in a 14-page brochure distributed by The Colorado Fuel and Iron Corporation. Among the photographs are several that show the microstructure of the rods. Mill practices are diagrammed and explained. A table at the end of the booklet lists operating hints for rod mills, and tabulates problems, causes, and required adjustments. **(315)**

MANUAL HARDSURFACING is discussed and explained in a detailed 12-page booklet published by The Lincoln Electric Company. Bulletin 3100.1 discusses the economics and metallurgy of hardsurfacing, analyzes the various conditions that demand surfacing, and provides information concerning electrode selection and procedures which will produce the type of surfacing required. **(316)**

REVOLVING SCRUBBERS for heavy-duty use are described in Bulletin HDS-70, issued by McLanahan and Stone Corporation. The scrubbers, made in three sizes, range in capacity from 60 to 250 t.p.h. The units are designed to clean sand, gravel, crushed stone, and various ores. It is possible to process fine and coarse feed simultaneously, or through the use of a desander, to remove fine materials first. **(317)**

SCREW CONVEYORS, SCREW FEEDERS, and components are described in 76-page Book 2989, available free from Link-Belt Company, Chicago, Ill. Over 20 different types of screws, 15 types of troughs (with 4 types of covers), 5 types of discharge openings, and 2 types of feeders are explained. Materials for which conveyors can be used are also listed. **(318)**

Material listed here is FREE unless otherwise noted.

FIRST CLASS
PERMIT NO. 44
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BUSINESS REPLY CARD
No Postage Stamp Necessary if Mailed in the United States

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NEW SUBSCRIPTION ORDER FORM

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Company_____

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Type of business and products _____

*U. S., U. S. Possessions, and Canada only.

Pan American countries, $10 a year; elsewhere, $15 a year.

REINFORCED PRIMACORD

Textile reinforced, tough, resilient, flexible. Recommended for surface trunklines and deep holes where normal strength and resistance to abrasion and cutting are needed. Tensile strength 150 lbs. 1000-ft. spool 18.5 lbs. Colors: Red stripe on yellow.

PLAIN PRIMACORD

Textile-covered, flexible and resilient. Suitable for surface trunklines and shallow holes where tensile strength and resistance to abrasion and cutting are not required. Tensile strength 125 lbs. 1000-ft. spool 17.5 lbs. Color: Yellow.

PLASTIC REINFORCED PRIMACORD

Covered with tough plastic material, not affected by high Summer heat or Winter cold. Waterproof—resistant to acids commonly encountered. Use for extremely deep holes, river crossings, field shots that must stand for long periods of time and in other wet conditions. Tensile strength 275 lbs. 1000-ft. spool 21 lbs. Color: White.

FIVE TYPES OF PRIMACORD® DETONATING FUSE

to meet varying blasting conditions

Primacord is used primarily for initiating commercial explosives. It consists of a core of high explosive encased in various combinations of protective coverings. When initiated with fuse and cap or electric blasting cap, it detonates along its entire length at a velocity of nearly four miles per second and with the initiating energy of a blasting cap at all points. A Primacord trunkline will initiate any number of additional lengths through simple knot connections. In a downline it will detonate cap-sensitive explosives with which it comes in contact.

Primacord is less sensitive to accidental detonation than the main charge of standard explosives. On at least one occasion it failed to detonate when directly struck by lightning.

PLASTIC WIRE COUNTERED PRIMACORD

A strong, tough Primacord, armored with wire and covered with a plastic material. Recommended for use in deep, ragged holes or with metal or fibre explosives containers, where strength and resistance to abrasion and cutting are essential. Tensile strength 300 lbs. 1000-ft. spool 31.5 lbs. Colors: red "barber pole" on white.

LO-TEMP PRIMACORD

Jacket of polyvinyl chloride plastic over rayon yarn countering gives this cord exceptional flexibility, with textured surface, slightly tacky. Cord has outstanding handling characteristics at all atmospheric temperatures. It bends easily and knots securely at *minus* 40°F. Recommended for trunklines and for downlines where abuse is not excessive. Tensile strength 190 lbs. 1000-ft. spool 19.5 lbs. Color: Yellow.

CONDITIONS	PRIMACORD DETONATING FUSE				
	Plain	*Lo-Temp*	*Rein-forced*	*Plastic Reinforced*	*Plastic Wire Countered*
Trunklines	X	X	X		
Small diameter holes — 1½"–2¾"	X		X		
Holes 3" dia. and greater, depending on depth			X	X	X
Secondary Blasting	X		X		
Deep, ragged holes			X	X	X
Deep, wet holes				X	X
When a field shot must stand a long time				X	X
Loading with heavily reinforced explosives containers					X

P-2

Free Sample Kit

contains dummy samples of five types of Primacord with brief descriptions. When you write for it, tell us about the job.

Primacord is available through your regular explosives supply sources.

THE ENSIGN-BICKFORD COMPANY

Simsbury, Connecticut — Since 1836

TYLER can help you screen new ideas

When you have a new application involving woven wire screen for processing materials, here's how to get the right answers: Turn to W. S. Tyler, the leading producer of woven wire screens for industry.

Usually, Tyler can give you the answer based on actual operating experience. But when new ideas and new problems are presented, our Customer Service Laboratory will dig in and come up with the solution. Samples of your raw material can be shipped to this Laboratory and tested on a variety of equipment, to pre-determine capacity and performance in plant operation. This enables us to positively recommend the proper screen for your requirements . . . by selection from over 53,000 existing specifications, or by development of a new one.

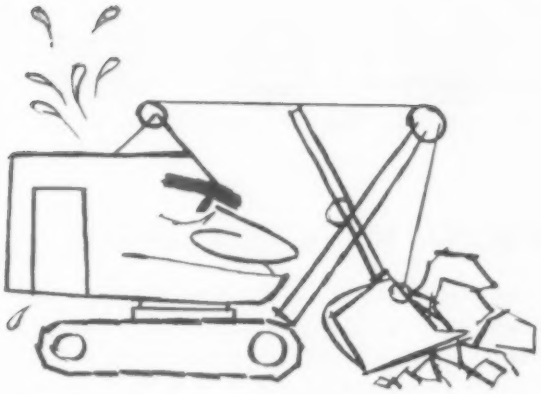
Specify Tyler woven wire screens for your processing and be sure it's right for the job.

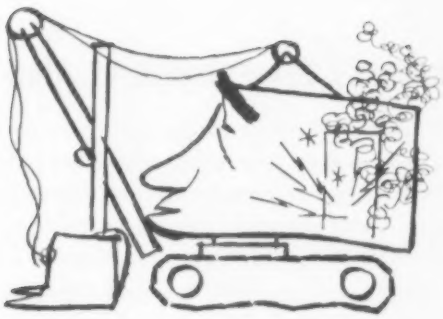
TYLER

WOVEN WIRE SCREENS • SCREENING MACHINERY
TESTING SIEVE EQUIPMENT

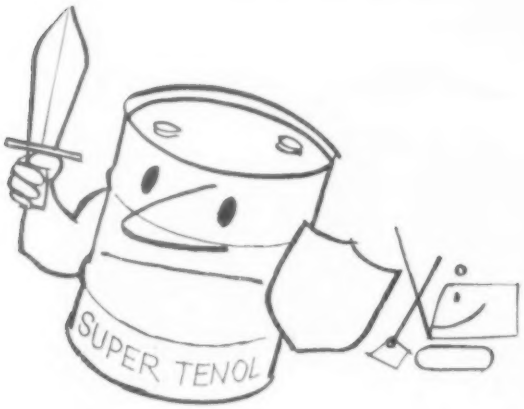
The W. S. TYLER Company • *Cleveland 14, Ohio*

OFFICES: New York • Chicago • Boston • Philadelphia • Atlanta • Dallas • Los Angeles San Francisco • Baltimore • Birmingham • Houston • Minneapolis • Pittsburgh • Salt Lake City • The W. S. Tyler Company of Canada, Ltd., St. Catharines, Ontario • OFFICE: Montreal





Diesel engines powering heavy equipment in mines and quarries can dish it out day after day. But can they take it... year after year? The record shows they can...when lubricated and protected by Sinclair SUPER TENOL® Motor Oil.



Diesels safeguarded by SUPER TENOL can withstand high temperature and stop-and-run operation...protect vital engine parts from varnish, sludge, rust and acid corrosion. The reason: SUPER TENOL combines high quality base oils with special additives. Put SUPER TENOL to work for you...call your Sinclair Representative or write

Sinclair

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TECHNICAL SERVICE DIVISION • 600 FIFTH AVE., NEW YORK 20, N.Y.

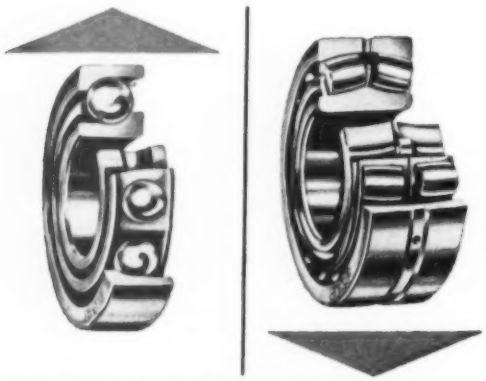
EVERY TYPE—EVERY USE
SKF
INDUSTRIES, INC., PHILADELPHIA 32, PA.

Spherical, Cylindrical, Ball, "Tyson" Tapered and REED Miniature Bearings

ANGULAR CONTACT BALL BEARING

This is the bearing to use when you need a high-speed bearing to support either (a) heavy thrust load, or (b) thrust load combined with radial load. It lends itself to various mounting arrangements. For example, if you need axial rigidity and high radial capacity you can mount two of these bearings in pairs either face-to-face or back-to-back. Or, if very high thrust capacity is needed, you can mount two or more of these bearings in tandem.

This standard bearing is available in over 80 sizes of single- and double-row types. Bore sizes range from ¾" to just over 7".



SPHERICAL ROLLER BEARING

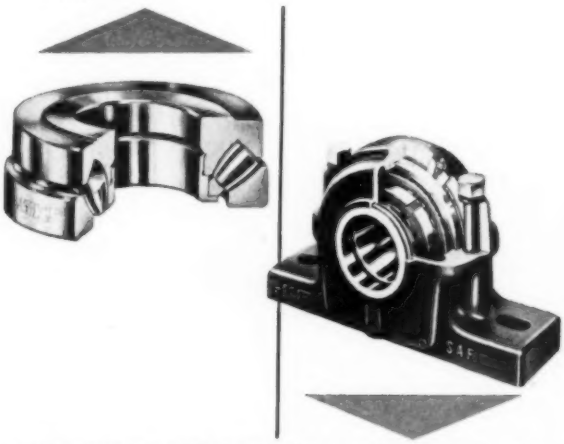
SKF invented the spherical roller bearing almost forty years ago. Since then, we've improved the original design several times—so that, today, our Type "C" spherical roller bearing offers longer life and 33⅓% greater capacity.

This increased capacity is largely due to the number, size and shape of the rollers—and the improved accuracy with which they're guided. Because these bearings are inherently self-aligning, their full capacity is always available for substantial thrust load in either direction as well as heavy radial load. These bearings also have special lubricating grooves that channel lubricants directly to the spherical rollers.

SPHERICAL ROLLER THRUST BEARING

Need a thrust bearing capable of carrying unusually heavy loads? Then specify this self-aligning spherical roller thrust bearing. It will carry either heavy thrust or combined thrust and radial loads. Because of its ability to carry high thrust at high speeds, this bearing is frequently chosen over large angular contact ball bearings for heavy-duty applications.

SKF makes this bearing in twenty-five standard sizes ranging from 4.3" to 14.9". And it's competitively priced.



TYPE SAF PILLOW BLOCK...with self-aligning ball or spherical roller bearings

Here's a rugged cast-iron pillow block that provides high efficiency with low friction.

We make this split pillow block with ball bearings for normal loads and with spherical roller bearings for heavy loads. We also equip it with Triple-Seal rotating rings that effectively protect the bearing from abrasives and corrosives, and prevent oil or grease from leaking out.

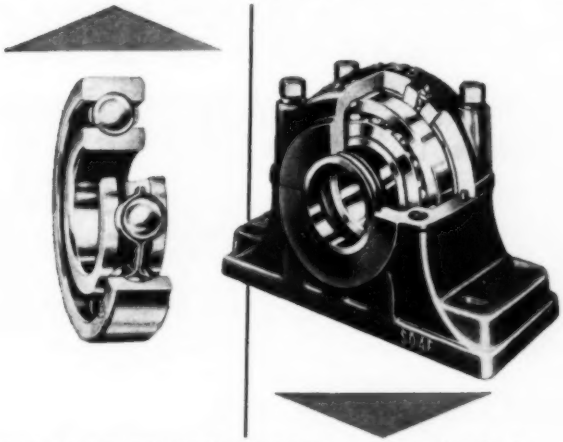
This pillow block can be mounted directly or with an adapter. Stabilizing rings are provided at no extra cost for applications where a "held" bearing is required to maintain shaft location. For heavy-duty applications, a cast steel housing (Type SAFS) is available. Shaft sizes from ¾" to 10½".

Only SKF can offer you unbiased bearing recommendations—because only SKF produces all four major types of anti-friction bearings: spherical, cylindrical, ball, and tapered roller bearings. For complete details on each type, just call the nearest of the twenty-four SKF sales offices.

SINGLE-ROW DEEP-GROOVE BALL BEARING

Here's a ball bearing that does two jobs, and does both of them well. It sustains heavy radial load as well as thrust load in either direction. Not only that, this bearing can be grease-lubricated when used at normal speeds and lubricated with oil at high speeds.

Yet this is a standard SKF bearing, mass-produced in various sizes at our automated Altoona (Pa.) plant. It's available in over 100 sizes ranging from over 5/8" O.D. to almost 16" O.D., and with various seal, shield and snap-ring combinations.



TYPE SDAF PILLOW BLOCK...with spherical roller bearings

Need an exceptionally sturdy pillow block? One that can withstand abnormal shock loads or heavy thrust loads day after day? Then specify SKF Type SDAF.

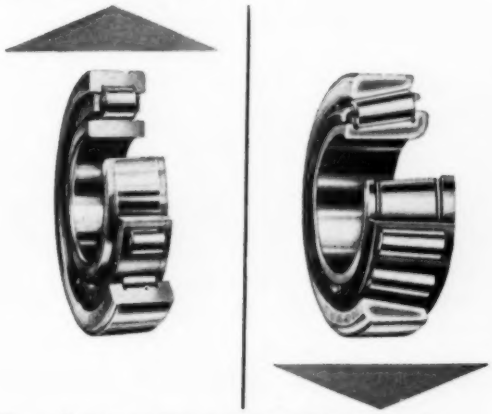
To provide maximum strength, four heavy bolts secure the cap of this pillow block to the base. Both halves are accurately aligned by dowel pins. And like the Type SAF, this pillow block comes equipped with Triple-Seal rotating rings that protect the bearing from foreign matter and retain the lubricant.

Type SDAF pillow blocks are made of cast iron but are also available in cast steel (specify Type SDAFS). They can also be mounted directly or with an adapter. Shaft sizes range from 2-11/16" to 14".

CYLINDRICAL ROLLER BEARING

Got a space problem? Here's a bearing that gives you high radial capacity—at very high speeds—in relatively small space. It's the SKF cylindrical roller bearing—which provides high radial capacity and minimum shaft friction. Controlled shaft end float within this bearing is a natural advantage of its design.

You can get prompt delivery in 154 bore sizes ranging from just under 1" to 6". Double-row cylindrical roller bearings are also available in bore sizes from 1" to 9.5".



Tyson® TAPERED ROLLER BEARINGS

What type of tapered roller bearing do you need: single-, double- or four-row? SKF's division, Tyson Bearing Company, makes all three of these types in a wide range of standard sizes.

The single-row type is especially suitable for carrying radial loads simultaneously. Double-row types are designed for use where the radial capacity of two single-row bearings is required. For special applications, the four-row type offers very high radial capacity in limited space.

All Tyson tapered roller bearings are interchangeable, size for size, with other makes of tapered roller bearings where the part numbers are the same.

5949

®REG. U. S. PAT. OFF.

Specify SANDVIK COROMANT ROPE-THREAD bits and steels

...for quick hand uncoupling!

No, it's not child's play, but the fact is you can uncouple Sandvik Coromant Rope-Thread bits and steels by hand! Smooth, shallow-depth, rounded threads with a pitch of just 2 turns per inch prevent binding. You'll have fewer thread failures too, compared with "saw-tooth" thread designs. What's more, only the threads are hardened, so you can re-thread steel sections without heat-treating. And, with faster uncoupling, you'll drill more feet per shift!

Coromant bits and steels have many other advantages, too: Better quality carbide (Sandvik is one of the largest manufacturers of carbide in the world)... better, more rigid steel... superior workmanship... all add up to above-average bit and rod life, up to double the footage between sharpenings, and straighter, cleaner holes.

Want proof? Easy! Call us and we'll arrange for a demonstration and test on your job. Write us today. Address: Dept. PQ-11.

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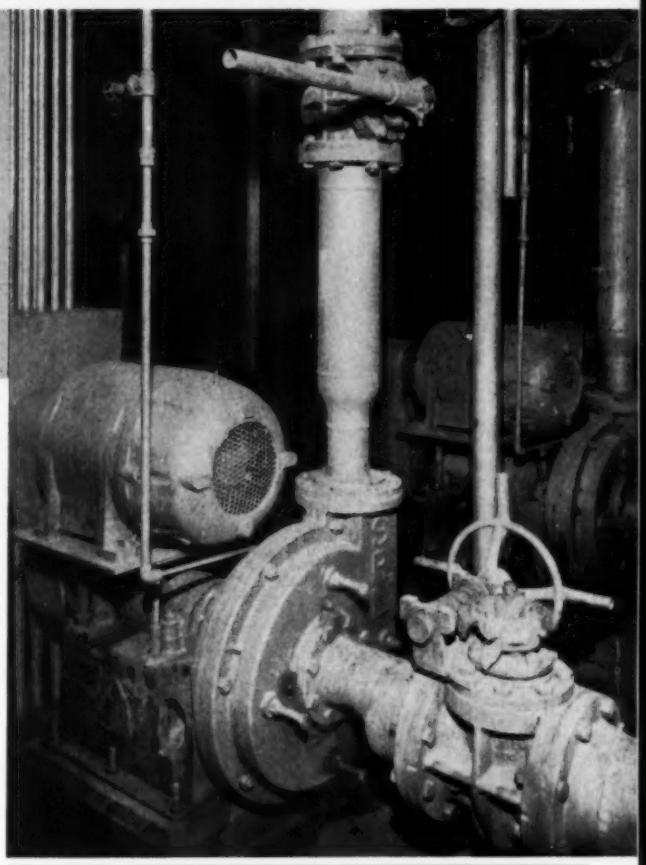
Here are the "dollars and cents" reasons why the trend is to

DENVER
SRL PUMPS



- ***SRL Pumps (and Parts) Cost Less—Last Longer***

  Quantity production makes DENVER SRL Pumps the lowest priced and highest quality molded rubber lined pumps on the market. Prices are so low that no operator can afford any pump service less than that of DENVER SRL Pumps. Parts cost less and last longer because casing liners and runners are made of specification rubber, pressure-molded to metal for longest wear, lowest maintenance. Rubber parts last up to 15 times longer than the best hard iron or alloy steel. Means fewer shutdowns... less down time.

- ***SRL Pumps Save up to 50% Horsepower***

  Runners and casing liners are pressure-molded to close tolerances over metal skeletons and backing plates. Precision fit of parts and resulting hydraulic efficiency mean savings as high as 50% in horsepower over other sand and slurry pumps.

- ***SRL Pumps and Parts are IN STOCK for Quick Delivery***

  All DENVER SRL Pumps are hydraulically tested, ready to install and operate... and are carried *in stock* for quick delivery. Fast replacement parts service reduces your inventory requirements and parts investment... cuts down time.

- ***STOP PAYING FOR HIGH COST PUMPING***

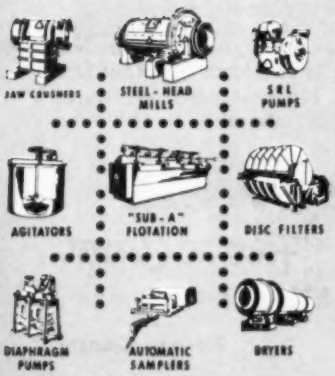
  A DENVER SRL Pump will pay you when it replaces an iron pump on abrasive service. Try it out at our guarantee and put your savings in the bank!

CAPACITY TO 5000 G.P.M.

SPECIFICATIONS AND DIMENSIONS

Pump Size and Type	Capacity 60′ Head RPM	HP	*Water GPM	Dimensions (In.) L	W	H	Approx. ship wt. lbs.
1½″x1¼″	2190	1.9	40	24	17½	23	525
2½″ x2″	1500	4.9	160	25½	17½	26⅜	575
3″ x3″	1400	6.8	260	31¼	19¾	31½	850
5″ x5″	1060	17.4	800	37¾	26¼	36½	1550
6″ x6″	1170	36.3	1600	45¼	28½	46½	2300
3″ x3″—C	1450	8.2	260	37½	21½	33¾	1240
5″ x4″—C	1035	12.6	700	40¼	27	37⅜	1600
8″ x6″—C	920	39.8	1600	63	36½	49¼	4375
10″ x8″—C	820	74.0	3300	68¾	43	57	5100
12″ x10″—C	615	115.0	5000	69⅝	46½	63	5900

*Based on water. Multiply horsepower by specific gravity of pulp to obtain actual brake horsepower.



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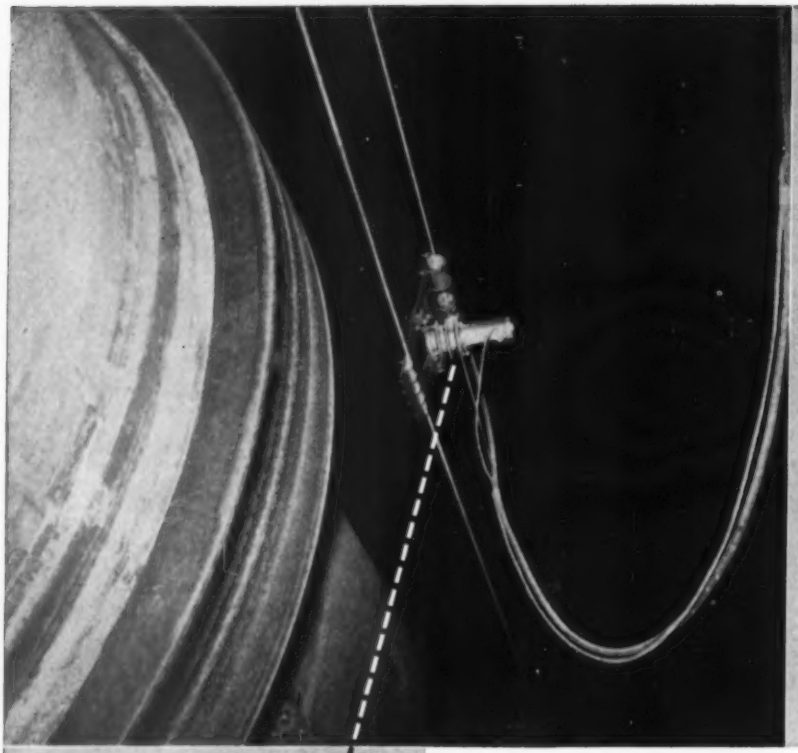
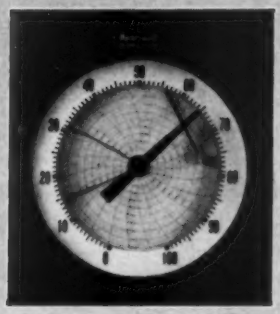


◀ TRAVELING ALONG KILN SHELL on steel cable, the *Radiamatic* unit provides continuous temperature measurement.



ElectroniK CIRCULAR CHART RECORDER records kiln shell temperatures and reference points showing position of *Radiamatic* along kiln.

RADIAMATIC RADIATION DETECTOR responds to 98 per cent of any temperature change within two seconds, is automatically compensated for ambient temperatures up to 250°F.

Hot Spot Hunter at Universal Atlas Cement cuts Kiln Downtime 70%

A cement kiln is seldom down for refractory replacement at U. S. Steel's Universal Atlas Cement Division, Gary, Indiana. A *Radiamatic* radiation detector continuously and automatically locates potential kiln hot spots before damage can occur – saving costly, time-consuming refractory replacement and production time.

When temperature-sensitive crayons were used to signal hot spots, a tested kiln was down five times in one nine-month period. In the first six months of operation with *Radiamatic* protection, the kiln was down just once.

The *Radiamatic* unit scans kiln shells along the full length of the hot zone, and works with an *ElectroniK* recorder which records both temperatures and reference points showing position of the detector along the kiln. When temperature reaches a preset limit, a signal light warns the burnerman that a potential hot spot is developing, and he can take immediate remedial action.

Your nearby Honeywell field engineer can give you complete details on how to apply this system to your own kiln. Call him today . . . he's as near as your phone. MINNEAPOLIS-HONEYWELL, Wayne and Windrim Avenues, Philadelphia 44, Pa.

Honeywell

First in Control

SINCE 1885

75th YEAR

PIONEERING THE FUTURE

Manufacturers' News

E. DON TULL has been elected president of Cummins Engine Company, Incorporated, Columbus, Ind., by the board of directors of the firm, according to J. IRWIN MILLER, chairman of the board.

E. D. Tull

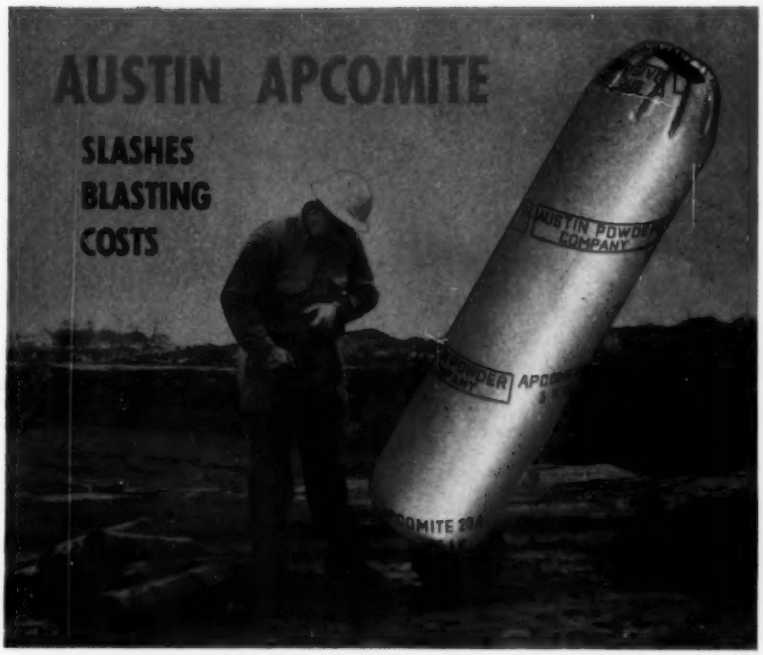
Mr. Tull, one of the earliest employees of this major manufacturer of diesel engines, will fill the vacancy caused by the resignation of R. E. HUTHSTEINER in February.

International Harvester Company is celebrating its 50th anniversary of tractor production in Chicago this year. In this time the company has manufactured more than 1 million product items.

WILLIAM B. MACOMBER has been named to the post of manager of industrial ammonium nitrate, and CHARLES M. COOLEY has been named to the post of manager of technical service, industrial ammonium nitrate, for Spencer Chemical Company, Kansas City, Mo. Appointment of the two men follows a streamlining and expansion of the company's sales program for ammonium nitrate as an ingredient in field-compounded blasting agents.

W. B. Macomber

C. M. Cooley



When results are compared, Austin Apcomite proves to be more economical to use than on-the-job ammonium nitrate mixes. Besides producing greater explosive power per foot of loaded blast hole, it combines the low initial cost features of processed ammonium nitrates with the handling ease and controlled shooting of regular explosives.

Field tested for 3 years, Apcomite is ready for loading in vertical or horizontal holes—ready to shoot. Each tube has a primer in its nose . . . requires no special priming. Because it is always manufactured under the same uniform conditions, Apcomite can be used for controlled shooting not possible with on-the-job ammonium nitrate mixes.

2 TYPES MEET ALL CONDITIONS

Apcomite 17 and Apcomite 20A incorporate specially-processed ammonium nitrate packaged in 23G tubes of 5" and larger diameters. While they are basically the same, No. 17 is for all normal usage while No. 20A, with its greater density, is for wet holes.

Austin also produces Austinite 15, a controlled ammonium nitrate mixture furnished in polyethylene-lined burlap bags. Likewise available in bulk bags of 50, 80 and 100 lbs.

7 REASONS FOR USING APCOMITE

- low final cost provided by greater explosive power per foot of loaded blast hole
- convenience . . . eliminates most shipping, storage, mixing and materials handling problems
- no special priming needed . . . primer in nose
- packaged in 23G tubes that are easy to handle and load
- uniformly manufactured . . . no chance of improper mixing
- permits controlled shooting
- adaptable to vertical or horizontal holes

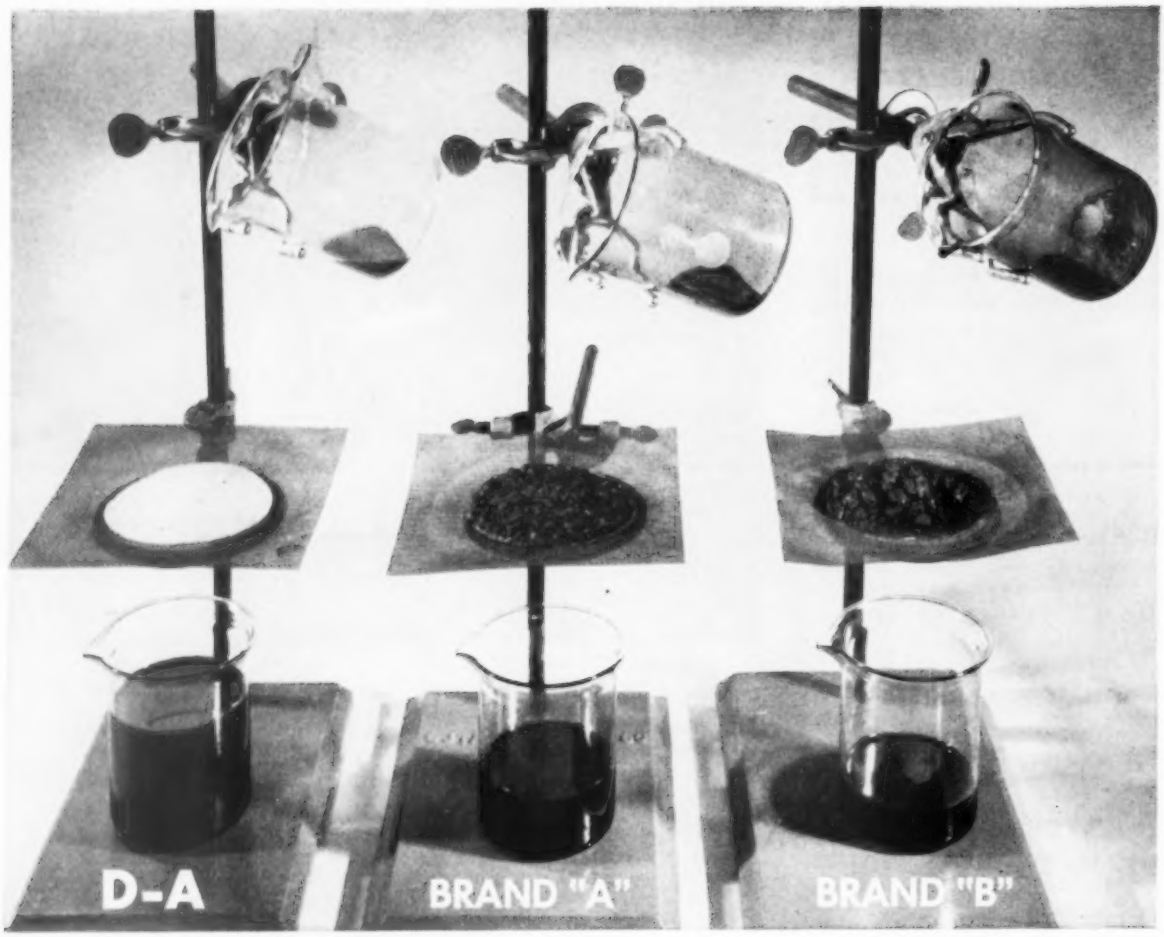
For complete details on how Apcomite can improve your operations, call your Austin representative today. A-401A

USED IN AUSTIN SINCE 1833 EVER

AUSTIN
POWDER COMPANY
CLEVELAND 13, OHIO

explosives ◆ ammonium nitrates ◆ primers ◆ detonating fuse
permissibles ◆ blasting supplies ◆ AP drill heads and bits ◆ mine tools

Enter 243 on card, page 233



Stop sludge, stop corrosion with D-A UNIVERSAL GEAR LUBE

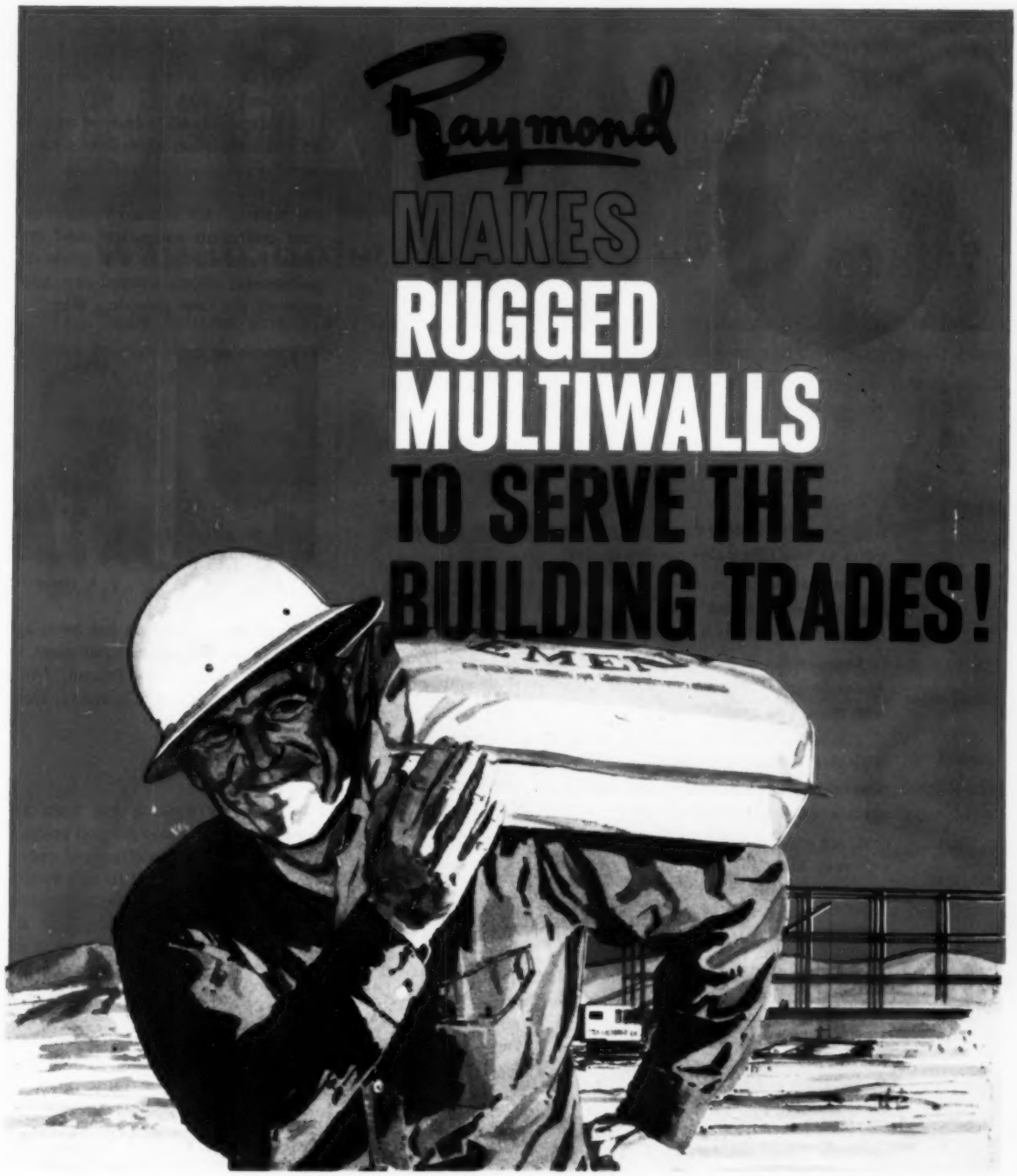
The unretouched photograph above shows the results of a 24-hour accelerated oxidation or sludge test. On the right, two leading brands of gear lube are badly oxidized following the test while, on the left, D-A Universal Gear Lube remains clear, stable and capable of extended use.

Here's what this means to your operation: film strength is the element of a gear oil which prevents wear. To obtain high film strength, extreme pressure additives are placed in the lubricant. At a temperature of about 250° — often encountered in heavy-duty equipment operation — these additives can oxidize, as they have in the competitive oils seen above. When this oxidation occurs, the oils become extremely corrosive and rapid wear results. Tests prove that D-A Universal Gear Lube does not corrode, even at temperatures as high as 300° F.

D-A Universal Gear Lube does not sludge or oxidize under high operating temperatures because D-A research has established successful means of retaining the stability of D-A's high-quality base oil while maintaining the high film strength necessary for extra-heavy-duty equipment operation. For greater protection of *your* equipment under heavy load and high temperature conditions, specify D-A UNIVERSAL GEAR LUBE.

Lubricating heavy-duty equipment across the nation since 1919.

D-A LUBRICANT COMPANY, INC. • INDIANAPOLIS 23, IND.



RUGGED MULTIWALLS AND RAYMOND SERVICE benefit every phase of your operation. Whether you need help on delivery . . . design . . . extensible papers . . . printing . . . skid-proofing . . . engineering . . . or special problems, check with a Raymond representative—his wide experience in multiwall packaging can save you money. Why not contact him now?

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"Maker of RUGGED MULTIWALL PACKAGING for Industry"

which egg is good?

which is bad?

From outer appearances you can't tell whether an egg is good or bad. The same applies to steel.

Replacement parts made by different manufacturers can look almost identical. Yet, the product of one will outwear competitive products by a substantial margin.

Because this is true, we invite you to COMPARE Columbia Armor-Tough crusher parts, under actual working conditions, with those you are now using.

Columbia leads the field in providing *more* wear where it counts, where rock meets metal. Columbia provides a full line of rugged crusher replacement parts, with most parts stock-piled for rapid shipment.

Once you make the acid test of service, once you COMPARE . . . you, too, will become a customer of Columbia Steel Casting Company.

Send for the new illustrated Columbia Bulletin No. 1063, featuring crusher, tractor, shovel, bucket replacement parts.

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933 N. W. Johnson, Portland 9, Ore. • Ph.: CA 7-0555

Eastern Office: 413 Empire Building, Pittsburgh, Pa.
Midwestern Office: 8000 Bonhomme Ave., Clayton, Mo.

Enter 246 on card, page 233

ROBERT T. PRING has been appointed to the newly created post of manager, Dust Collector Sales at Dracco Division of Fuller Company, Cleveland, Ohio.

An experienced industrial hygienist and consultant as well as a registered professional engineer, Mr. Pring will direct sales and marketing activities for Dracco's line of dry dust collection equipment and systems. Particularly, he will guide departmental efforts toward expanded sales of the new glass-bag filter.

R. T. Pring

F. R. Elsner

F. ROBERT ELSNER has been appointed to the sales department of the Manufacturing Division, Mine and Smelter Supply Company, Denver, Colo.

E. J. MYTKOWICZ has been appointed to the newly created position of vice-president in charge of operations of the Hewitt Rubber Division of Hewitt-Robbins, Incorporated.

Mr. Mytkowicz started with the company in 1947 and was, most recently, manager of operations of the Jones Machinery Division, Chicago.

His successor in Chicago will be R. A. BUESE, formerly manager of product sales of the Jones Machinery Division. Mr. Buese joined the Jones organization as a salesman in 1953.

PAUL J. WOLFERT has been appointed director of sales for Quick-Way Truck Shovel Company, Denver, Colo. Quick-way, owned jointly by H & B American Corporation, of Los Angeles, and Fairbanks Whitney Corporation, of New York, manufactures mobile power shovels, cranes, and other earth-moving equipment for industrial and military use.

one of a series:

HEIL

How to improve dump truck operations

Which hoist: arm-type or telescopic?

The choice between arm-type and telescopic hoists depends on the kind of hauling jobs and conditions you face. There's a place for both.

Telescopics for Maximum Payloads

If maximum legal payloads are your most important consideration and hauling conditions

are not severe, you should look to a telescopic. The very nature of a telescopic hoist makes it lighter in weight so it requires less reinforcing of the body subframe for a given load-handling capacity. Less weight, of course, gives you more payload per trip. Among all telescopic hoists, the headmount type will afford the most payload lifting capacity with the least deadweight in hoist components.

Arm-type for Roughest Work

If your hauling is on rough, uneven ground, you'll want the ruggedness of a well-designed arm-type hoist, with either single or twin hydraulic rams. With fewer bearing points and a simple lift arm linkage, a Heil hoist of this type not only holds its body in alignment with the truck frame as it dumps, but also offers toughness and durability you'll want for heavy-duty service.

Most Important — Get Expert Help

Your Heil distributor has no axe to grind — he sells both kinds of hoists in a complete range of capacities. He knows how to get maximum legal loads in your area . . . can give you a complete package recommendation that will serve you best. So next time you buy a hoist, get unbiased facts from your Heil man. The Heil Co., Milwaukee 1, Wisconsin.

These Heil dump bodies are only a part of a larger Heil fleet at work on a huge air base construction job.

SEND FOR FREE BOOK

THE HEIL COMPANY
Body and Hoist Division, Milwaukee 1, Wis.:

Send me Heil's new illustrated manual, "How to Select the Right Body and Hoist," as soon as possible. (Check here_____if you'd like a salesman to call.)

*Name*_____

*Address*_____

*City*_____ *State*_____

Four men have been appointed group vice-presidents for H. K. Porter Company, Incorporated, Pittsburgh, Pa.

FRED W. ELLIOTT will work with the Porter divisions manufacturing friction and rubber products, refractories, and paint, as well as the Mexican operations.

JAMES A. DRAIN will have group responsibility for the company's electrical divisions and Canadian operations.

EMMETT H. MANN will supervise the fabricated metal products divisions.

B. CAMPBELL BLAKE will continue to operate the Connors Steel Division, and will also oversee the operations of Vulcan-Kidd Steel Division, at Aliquippa, Pa.

ARTHUR E. SCHENCK has been named service manager of the East Pepperell (Mass.) manufacturing plant, Bemis Bro. Bag Company.

The appointment of E. A. SMITH as director of foreign operations for Koehring Company, Milwaukee, Wis., and the election of VINCENT R. PETERSON as secretary of the company has been announced.

Mr. Smith, who has been with the company since 1953, will be in charge of all of Koehring's overseas manufacturing and licensing activities. He replaces F. H. HEINE, who retired recently.

E. A. Smith

V. Peterson

Mr. Peterson, elected secretary, replaces P. P. GRASER, who retired in February after more than 30 years with the company. The board of directors voted to discontinue the office of company treasurer.

JOHN TODD has been appointed sales service manager for St. Regis Paper Company in the Los Angeles district of its Bag Division. Mr. Todd succeeds G. E. DICKINSON, who has been transferred to the St. Regis Kraft Division at Tacoma, Wash.

WARREN M. GANNON, sales manager of the western area of the Bag Division, has moved from the company's sales office in Los Angeles to San Francisco.

Peabody Engineering Corporation of New York, N. Y., designer and manufacturer of fuel burners, air heater furnaces, and gas scrubbers, has announced the appointment of The Burhans-Sharpe Co., Seattle, Wash., as agent in Washington, Oregon, and northern Idaho for the sale of air heater furnaces and kiln burners. At present Burhans-Sharpe is agent for gas scrubbers, coolers, and absorbers.

Wyatt & Kipper Engineers, Incorporated, also of Seattle, will continue to handle the sale of Peabody's register and package fuel burners.

SCHROCK Pulleys Deliver HIGHER TONNAGE

Thousands of Schrock Pulleys, in daily use world-wide, are moving "profit-tons" of material at the flip of a switch . . . month after month . . . under all weather and working conditions.

ECONOMICAL

Schrock dependability virtually eliminates down time and maintenance costs. Also eliminated are motor mounts and bases, couplings, sprockets or sheaves, chains and belts.

SAFE

Schrock Pulleys have been given highest safety ratings . . . no exposed moving parts to endanger workmen.

COMPACT

The Schrock requires only space for the pulley. All moving parts are housed inside the pulley shell.

EASY INSTALLATION

Only one unit to install. Install five bolts, connect electrical leads and the Schrock Pulley is ready to go.

Schrock Hydraligner — hydraulic take-up

tightens, aligns conveyor belts or feeder chains in seconds, using only a standard grease gun. Eliminates down time — no more rusted or damaged threads, slipping wrenches. Lengthens belt life . . . dependable and accessible. Easily piped for remote control.

Schrock Motorized Pulleys are manufactured in varying sizes and motor ratings from 1 to 125 horsepower.

Manufactured by

WESTERN CONVEYOR CO.

P. O. Box 357 Boise, Idaho TWX BE 197

Enter 248 on card, page 233

SPEED YOUR DIGGING OPERATION

SHARP FORGED HIGH ALLOY STEEL DIGGING TEETH

PAT. NO. 2716822
2762139

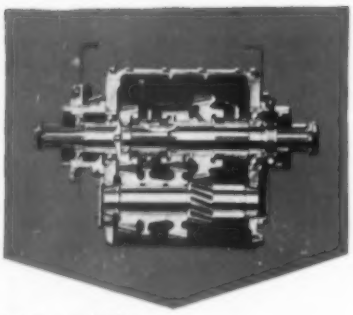
- LOAD SHOVEL IN HARDEST MATERIAL
- STAY SHARP THROUGHOUT LONG DIGGING LIFE
- CUT EQUIPMENT WEAR AND MAINTENANCE COSTS
- MOVE MORE MATERIAL WITH LESS COST

WEAR - PLATE ADAPTER

Minimizes adapter wear—simply replace when worn and adapter is restored to near new condition.

SEE YOUR H&L DEALER

H&L TOOTH COMPANY
1540 South Greenwood Avenue
Montebello, California



Specify

FULLER

Specify the

MODEL

For medium-heavy duty trucks and tractors specify the

FULLER '65 SERIES

3-SPEED AUXILIARY

- High capacity
- Widest range of ratios
- Top-mounted power take-off optional
- Low initial cost, reduced maintenance
- Available from all truck manufacturers on specification

65 SERIES (Medium-heavy-duty) RATIOS

	SPLITTER RATIOS		DEEP REDUCTION
MODEL	High	Intermediate	Low
3-A-65	.754	1.00	2.221
3-B-65	.804	1.00	1.239
3-C-65	.754	1.00	1.239
3-D-65	.804	1.00	2.221
3-E-65	.804	1.00	1.74
3-F-65	.754	1.00	1.74
3-G-65	1.00	1.32	2.221
3-H-65	1.00	1.32	1.74

Specify

Specify the MODEL

FULLER MANUFACTURING COMPANY
(Transmission Division)
KALAMAZOO, MICHIGAN
Subsidiary EATON Manufacturing Company

Enter 250-A on card, page 233

The Los Angeles branch of Waukesha Motor Company has been moved into its new building in Huntington Park, Calif. Although the Watts, Calif., office has also been closed, the teletype connection, and the telephone will remain unchanged until the middle of April. Parts stock will also be available at Watts until the middle of April.

J. Albiez

JOSEPH ALBIEZ has been appointed general sales manager for Construction Machinery, South Bend Division, Curtiss-Wright Corporation. Mr. Albiez has been product sales manager and technical sales manager since Curtiss-Wright's entry into the construction machinery field.

The election of LYMAN E. NEWTON to the post of executive vice-president and director of its subsidiary, Chain Belt (Canada) Ltd., Toronto, has been announced by Chain Belt Company, Milwaukee. It was also announced that HENRY L. FJELLMAN succeeds Mr. Newton as controller of the company in Milwaukee.

L. E. Newton

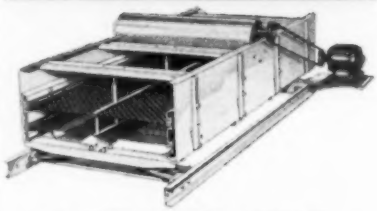
H. L. Fjellman

Mr. Newton joined Chain Belt in 1940. Prior to his appointment as controller in 1952, he served in the purchasing and accounting departments in Milwaukee.

Mr. Fjellman started with Chain Belt at Springfield in 1946. In 1952 he was named chief accountant of the roller chain division and, in 1956, was appointed divisional controller.

FOR PROFITABLE SCREENING USE

UNIVERSALS



- **FAST, SIMPLE, RUGGED**
- **DEPENDABLE**
- **ECONOMICAL**
- **STOCK DELIVERIES**
- **FAST SERVICE**

Write today for free catalog No. 150 on screens and screening

UNIVERSAL VIBRATING SCREEN CO.
Racine, Wisconsin
Quality Screens Since 1919

Enter 250-B on card, page 233

A New Development in Open Gear Lubrication

PLASTIGEAR 815

OPEN GEARS RACKING DIPPER STICKS

Extremely adhesive, non-melting waterproof and high film strength. Stable at all temperatures—will not drip off with heat or chip off with cold.

We believe Plastigear 815 is the best open gear or dipper stick lubricant manufactured to date. No solvents or pre-heating—use as is!

Want proof? Sample and information will be furnished on request.

THE WARREN REFINING & CHEMICAL CO.
CLEVELAND 2, OHIO

Enter 250-C on card, page 233

Still ANOTHER Cottrell Advancement By Western Precipitation...

UNIQUE "FULL-RANGE" RAPPER CONTROL PROVIDES ENTIRELY NEW STANDARDS OF VERSATILITY

Rapping Frequency... Rapping Intensity... Rapping Pattern

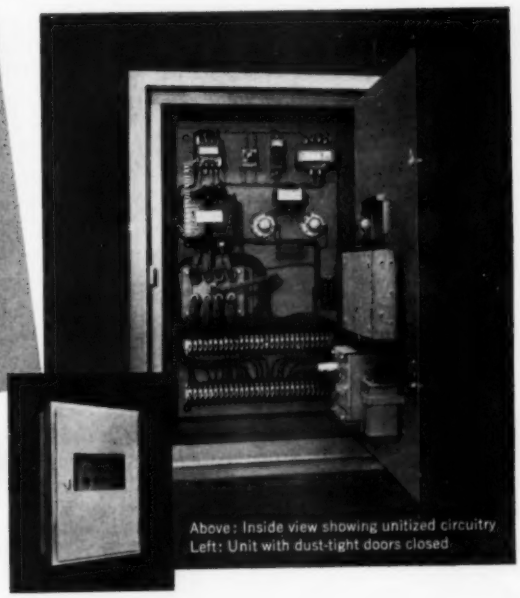
ALL EASILY ADJUSTABLE TO MEET OPERATING REQUIREMENTS

THE PROBLEM:

In the operation of Cottrell Precipitators it is necessary to remove the dust, fume or fly ash that has collected on the plates and cause it to be deposited in a hopper for subsequent removal from the Precipitator. The Rapping System should accomplish this removal with minimum disturbance to the already collected material (to avoid re-entrainment) and with maximum cleaning of the plates.

However, collected materials vary widely in their physical characteristics. Some are sticky. Some agglomerate readily and in thick layers without disrupting electrical operation. Still others have no tendency whatever to agglomerate, but form a sheet of loose particles on the plate.

There is no "typical" dust—no fixed set of conditions to be met. Yet the Rapper System must be readily adaptable to efficient dust removal, regardless of dust characteristics!



Above: Inside view showing unitized circuitry
Left: Unit with dust-tight doors closed

THE SOLUTION:

With so many variables to be compensated, unusually wide adjustability of the Rapper System has long been a prime objective for optimum operating efficiency. But complex factors have prevented its attainment until development of Western Precipitation's new "Full Range" Rapper Control.

By simply adjusting a few dials, "Full Range" Control permits:

- **FULL FREQUENCY ADJUSTMENT** from a complete rapping cycle every 50 seconds to one every 3½ hours... or any desired cycle in between!
- **FULL INTENSITY ADJUSTMENT** from zero to maximum over an unusually wide range!
- **FULL PATTERN ADJUSTMENT** 2, 4 or 8 impacts per cycle can be selected, with each cycle varying from light to heavy on successive impacts within the cycle—all automatically controlled to a choice of pre-selected operating limits!

Other Important Advantages...

Greater Safety: The "Full Range" Control has no dangerous high voltage circuits to endanger personnel. Entire unit is in "low-voltage" category.

All "Passive" Design: There are no motors, gears, or other high maintenance components in the "Full Range" Control. It is completely electronic.

Space-Saving Compactness: The "Full Range" Control requires about *half* the space of previous designs. Also is water and dust tight—can be located virtually anywhere.

Unitized Circuitry: All related parts are unitized into separate "cans" for simplified maintenance.

Free! NEW BROCHURE which describes and illustrates the new "Full Range" Rapper Control—the latest product of Western Precipitation's program of continuous advancement!

For quick assistance, call or wire **collect** *our nearest office.*

A-M-101

WESTERN PRECIPITATION

DIVISION OF JOY MANUFACTURING COMPANY

COTTRELL Electrical Precipitators
MULTICLONE Mechanical Collectors
CMP Combination Units
DUALAIRE Jet-Cleaned Filters
THERM-O-FLEX Hi-Temp Filters
TURBULAIRE-DOYLE Scrubbers
HOLO-FLITE Processors
HI-TURBIANT Heaters

Engineers and Constructors of Equipment for Collection of Suspended Material from Gases . . . and Equipment for the Process Industries

LOS ANGELES 54 • NEW YORK 17 • CHICAGO 2 • PITTSBURGH 22 • ATLANTA 5 • SAN FRANCISCO 4

Representatives in all principal cities

Precipitation Company of Canada Ltd., 8285 Mountain Sights Avenue, Montreal 9

FOR DEPENDABILITY
PLUS ECONOMY
REPLACE WITH
INDIAN BRAND

Get the most out of your present equipment. When you need replacements, remember we started in 1913 to build our reputation in the Manganese Steel field for dependability plus economy.

Insist on
INDIAN BRAND
MANGANESE STEEL

Shovel Dippers • Dipper Teeth
Shovel Treads
Crusher Jaw Plates
Mantles • Concaves
Bowl Liners • Roll Shells
Pulverizer Hammers
Grate Bars • Breaker Plates
Ball Mill Liners • Screen Plates
Misc. Manganese Steel Castings

THE FROG, SWITCH AND
MANUFACTURING COMPANY
Carlisle, Pennsylvania • Established 1881

Enter 252-A on card, page 233

By an agreement between Bailey Meter Company, Cleveland, Ohio, and Packard Bell Computer Corporation, Los Angeles, Calif., concluded recently, Bailey will apply Packard's new, medium-scale "second generation" computer as a component of Bailey systems for power plants and industrial processes.

HAROLD BROWN has been appointed sales manager of the Steering Gear Division, and LAVERNE E. SMITH has been appointed manager, electrical applications—Sales Engineering Division—for R. H. Sheppard Company, Incorporated, diesel engine manufacturer at Hanover, Pa.

PHILLIP J. ROBERTS has recently joined Stulz-Sickles Company as district sales manager for metropolitan New York, New Jersey, and Philadelphia. Mr. Roberts' duties will encompass full responsibility for distribution and sales of Manganal welding products.

The appointment of CHARLES (CLIFF) MITCHELL to the position of sales manager, Latin America, Tractor-Loader Division—The Eimco Corporation, has been announced. Included are South America, Central America, and the Carribbean countries.

Mr. Mitchell joined the sales department of the Eimco organization early in 1951.

C. Mitchell

E. F. Scherr

EUGENE F. SCHERR has been named manager of the Midwest territory of the Western Precipitation Division, Joy Manufacturing Company. He has been with the company, in the Chicago office, for the last 15 years. Mr. Scherr will be in charge of sales and service for the company's dust and fume-control equipment.

Appointment of A. E. Finley and Associates, Raleigh, N. C., to handle the line of Armor-Tough replacement parts for crushers, tractors, and shovels was announced by Columbia Steel Casting Company, Portland, Oreg.

A. E. Finley and Associates will represent Columbia in North and South Carolina and Virginia. To provide maximum service, a stock of Columbia parts will be maintained at the several A. E. Finley and Associates locations.

S. G. DUKELOW, previously manager of the New Orleans district, recently became manager of the San Francisco district of Bailey Meter Company. He succeeds V. A. RUMBLE who has retired after 37 years with the company—30 of them as San Francisco manager. W. P. DAVENPORT, an industry specialist in The Pulp & Paper Division, East Orange office, has been named manager of the New Orleans district.

Wherever Ore Moves, SCOOT-CRETE
Ore Carriers Move It • FASTER • EASIER • AT LOWER COST

SCOOT-CRETE CD-4, shown being loaded in mine, will carry up to 15 tons payload. Model CD-3N has 5-ton payload. Note driver's side-mounted position for maximum vision and efficiency, forward and rear.

Throughout the world, SCOOT-CRETE gives top-rate performance. No rails needed, no ties, no cars, no independent power source. Diesel-powered for operation inside the mine, SCOOT-CRETE carriers are rugged for around-the-clock service; carry up to 15 tons at speeds to 15 mph, climb grades up to 18%. Available with standard or fully automatic transmission. SCOOT-CRETE has equal speeds forward and reverse for fast shuttle service. All CD models approved by U. S. Bureau of Mines for underground mining.

Units available from 3,000 lb. to 15-ton capacity. Write for specifications and literature. See your Dealer. GETMAN BROTHERS SOUTH HAVEN, ZONE 6, MICHIGAN

Enter 252-B on card, page 233

product:

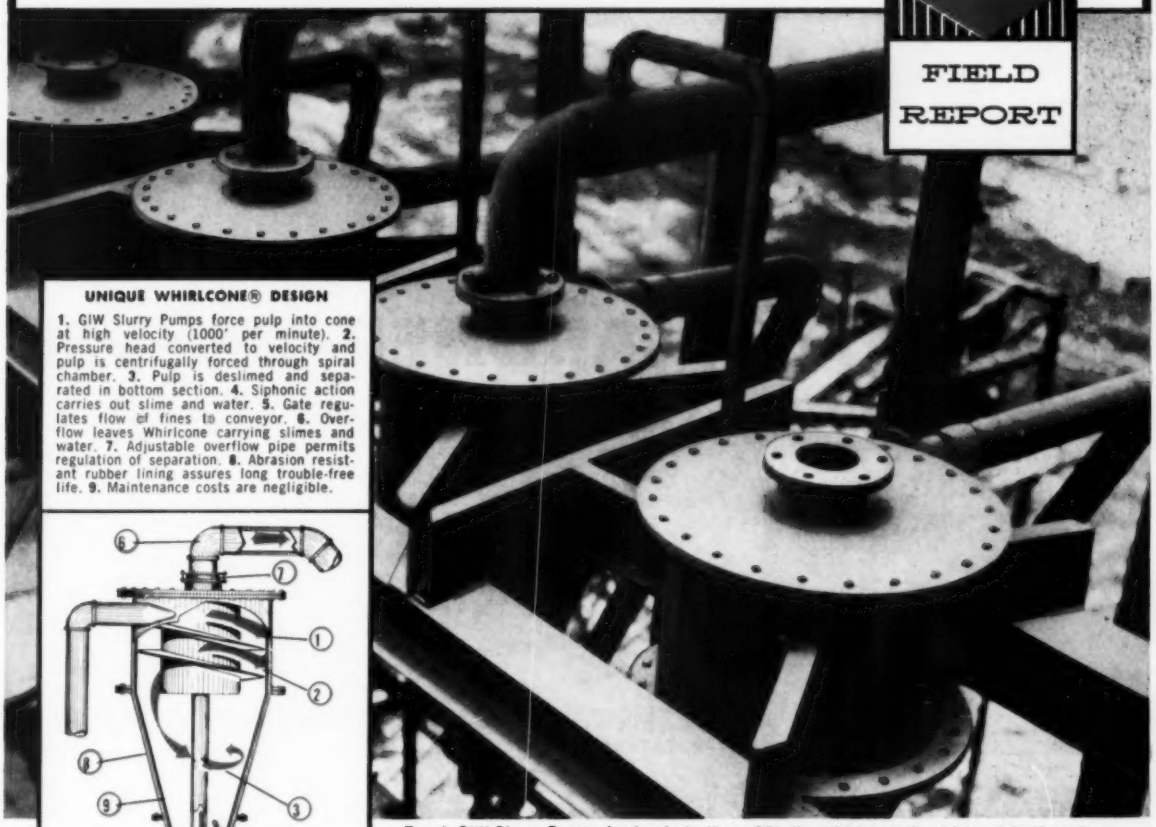
COTTRELL WHIRLCONE® SEPARATORS

customer:

BECKER COUNTY SAND & GRAVEL CO.

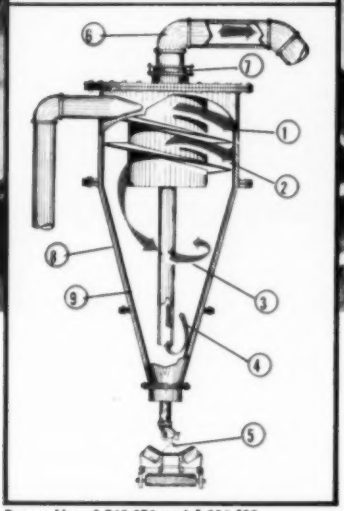
GIW

FIELD REPORT



UNIQUE WHIRLCONE® DESIGN

1. GIW Slurry Pumps force pulp into cone at high velocity (1000' per minute). 2. Pressure head converted to velocity and pulp is centrifugally forced through spiral chamber. 3. Pulp is deslimed and separated in bottom section. 4. Siphonic action carries out slime and water. 5. Gate regulates flow of fines to conveyor. 6. Overflow leaves Whirlcone carrying slimes and water. 7. Adjustable overflow pipe permits regulation of separation. 8. Abrasion resistant rubber lining assures long trouble-free life. 9. Maintenance costs are negligible.



Patent Nos. 2,738,070 and 2,806,599

Tough GIW Slurry Pumps feed pulp to these 25" dia. Whirlcones®, which retain fines from classifier overflow. Maximum recovery rate is 20 tons per hour per cyclone. The cones will handle material from −12 mesh to lightest slime.

Whirlcone® Separators solve difficult fine recovery problems.

The retention of fines in the −50 plus 200 mesh range posed a disturbing problem for the Becker County Sand & Gravel Co., of Cheraw, S.C., primarily because the large amount of water used in processing the sand and gravel washed out the desirable fines with the minus 200 slimes.

Fourteen 25" dia. Whirlcone® wet type cyclones installed parallel in four Becker plants solved this problem completely. Operating an average of 8 hours daily, they extract up to 100 tons of clean, fine sand per hour from wash water while the minus 200 mesh slime is discarded.

Recovered fines are used to bring sand up to specifications. Thousands of tons of valuable sand, formerly lost, soon paid for the low cost of the Whirlcones®.

GIW's highly efficient Whirlcones® are also being used in the mining fields to deslime, degrit, classify, concentrate, make dam and mine backfill and to dewater or thicken where the overflow can be returned to the process or it can be discarded.

They are available in diameters from 6" to 50". Capital cost including the pump is 20 to 50% of conventional classifiers.

If you are losing fines from material −12 mesh to lightest slimes, write today. Recommendations and literature will be forwarded promptly.

COTTRELL ENGINEERING
Division of
GEORGIA IRON WORKS CO.

GIW

Manufacturers of pumps, dredges, separators and accessories.

AUGUSTA • GEORGIA

OPENING A NEW ERA IN PERCUSSION DRILLING...

New PR123 GARDNER-DENVER Power Rotation Rock Drill

ABSOLUTE CONTROL

New Gardner-Denver PR123 gives your operator absolute and independent control of all these vital functions:

ROTATION WITHOUT IMPACT —efficient gear motor supplies rotation in either direction, even when drill is not impacting. Three rotational speeds.

IMPACT WITHOUT ROTATION —separate control provides drill impact without rotation. Percussion can be varied from light to heavy blows, and used to loosen couplings or stuck steel.

IMPACT AND ROTATION —use light percussion and rapid rotation for soft formations . . . or heavy impact and slow rotation for drilling hard rock.

UP TO 30% FASTER PENETRATION

New PR123 uses all hammer energy for percussion. There's no rotational drag on piston hammer. Results: faster hard-rock drilling than ever before. Depth of hole does not affect drilling speed.

SELECTIVE DRILLING

Now your driller can select the right combination of rotation speed, impact force, feed pressure and hole blowing for fastest penetration in any type of rock—can change drilling action as soon as the bit hits a new formation.

NO ROTATION PARTS IN CYLINDER

New PR123 has no rifle bar, ratchet ring, pawls, or other internal rotation parts that frequently cause trouble. Rotation is supplied by an efficient gear motor, and a torsion bar absorbs rotational shock between shank and motor.

POWER COUPLING AND UNCOUPLING

Independent power rotation is a time-saver. Rotation without impact permits power coupling of threaded rod without thread damage. Reverse rotation speeds uncoupling when coming out of the hole. Independent power rotation also helps free stuck steel.

Specifications: Piston diameter: 4½". Length: 38½". Weight, less mounting: 290 pounds.

GARDNER-DENVER Since 1859

EQUIPMENT TODAY FOR THE CHALLENGE OF TOMORROW

GARDNER-DENVER

Gardner-Denver Company, Quincy, Illinois

In Canada: Gardner-Denver Company (Canada), Ltd., 14 Curity Ave., Toronto 16, Ontario

World's Longest Quarry Shovel Boom

This is a picture of the solution for an unusual problem—involving a 160-foot boom, the world's largest on a quarry shovel.

A "special," it typifies Marion's ability and willingness to go to unusual lengths to solve customer problems.

The machine is a Marion 5323 which carries an 11-yard dipper, 95-foot handle and 160-foot boom to deal with a rocky bank ranging up to 135 feet in height. This machine's ability to dump 326 feet away from the wall made it the ideal answer to this big quarry's problem.

Why not let Marion specialists take an imaginative look at your quarrying and mining needs?

CONSULT MARION MINING SPECIALISTS
for lowest costs on your property!

MARION POWER SHOVEL COMPANY • Marion, Ohio, U.S.A.

A Division of Universal Marion Corporation

PROCEED, DEFER OR MODIFY?

Kaiser Engineers can help you decide

Objective analysis is vital to sound decision on new plant or expansion projects. Feasibility studies, economic analyses and site evaluations are yours by an outside, impartial firm when Kaiser Engineers is selected to help you decide when, how and where to proceed.

These services are in addition to the design and construction of major facilities for the Minerals industry.

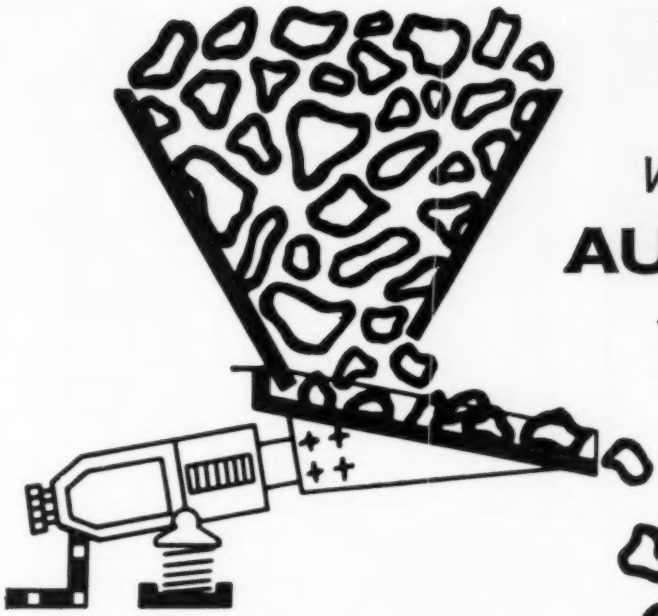
KE offers complete, one-company, integrated service from concept through construction—plus world-wide experience and the ingenuity to build quickly, within budget.

KAISER ENGINEERS

Division of Henry J. Kaiser Company
Oakland 12, California
Pittsburgh, Washington, D. C., Chicago, New York

• KE projects include work in Australia, Brazil, Ghana, India, New Zealand, as well as Canada and the United States. Assignments include iron ore concentrating plants, cement plants, bauxite and alumina processing plants and diatomaceous earth facilities.

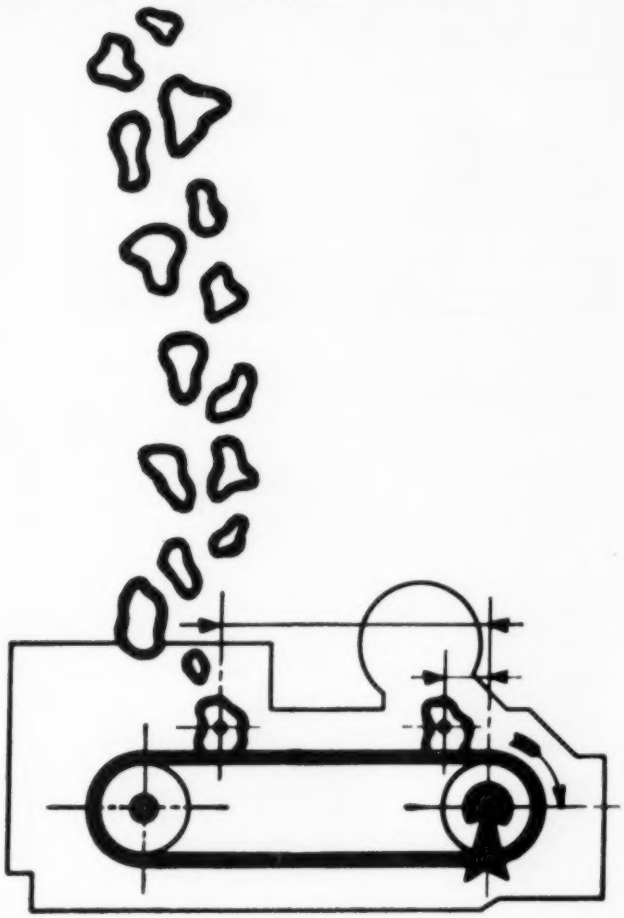
5458-M



When you're planning

AUTOMATION...

there's a JEFFREY feeder to control material flow



JEFFREY ELECTRIC VIBRATING FEEDERS are capable of handling most classes of materials and of meeting all flow requirements—a few pounds or many tons per hour. Feeders can be operated on the level, up- or down-grade, and rate of feed can be changed at will while the unit is running. Various styles of decks can be furnished, to suit materials handled and operating conditions.

Many manufacturers include Jeffrey vibrating feeders to maintain a flow of materials into and away from the machinery they are building.

JEFFREY WAYTROL® CONSTANT WEIGHT FEEDERS are often designed into a system where bulk materials must be fed to a process at a definite rate, or where proportioning is handled automatically. The Jeffrey Waytrol is an accurate, rugged unit for weight-metering materials. Separate feeding components are supplied to meet individual requirements; vibrating feeders, spiral or belt conveyors.

Waytrols range in capacities from 60 pounds per hour to 750 tons per hour. Tell us the capacity you need, the character of the material you plan to handle, and Jeffrey engineers will recommend the feeding layout you need.

For Catalog 941 describing Jeffrey equipment for the process industry, write The Jeffrey Manufacturing Company, 917 North Fourth Street, Columbus 16, Ohio.

JEFFREY

CONVEYING • PROCESSING • MINING EQUIPMENT
...TRANSMISSION MACHINERY...CONTRACT MANUFACTURING

LINATEX
LASTS LONGEST

Line WITH LINATEX
(a specially processed rubber)
the most effective way to combat abrasion
CHUTES — LAUNDERS
HOPPERS — SKIPS
TABLE DECKS
CONVEYOR BELTS
Write for free information

LINATEX CORP. OF AMERICA
P.O. DRAWER "D", STAFFORD SPRINGS, CONN.

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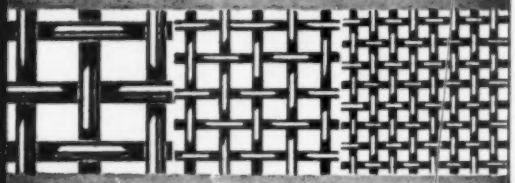
STRONG AS ARMOR
NAT-ALOY
Woven Wire Screens



Reliable Nat-Aloy woven wire cloth is specified throughout industry for maximum screening accuracy and economy. Available in flat surface, lock crimp, double crimp, rectangular and long slot openings. All sizes, meshes and gauges—prompt shipment.

WE OFFER NOW... SUPER NAT-ALOY
OIL TEMPERED WOVEN WIRE CLOTH
★ GREATER RESISTANCE TO ABRASION
★ MORE TONNAGE AT LOWER COST
★ FEWER COSTLY CHANGE OVERS

Write for information. Also stainless steel wire screens.

NATIONAL WIRE CLOTH COMPANY
252 W. Fairfield Ave., St. Paul 1, Minnesota

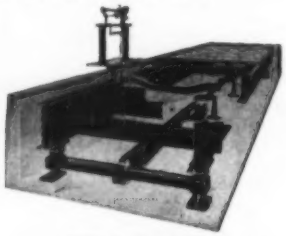
Enter 258-C on card, page 233

Winslow TRUCK SCALES
PIT AND PITLESS TYPES

CABINET DIAL
Weight indication available includes ball bearing poise weighbeams, direct reading and weight imprinting types, and dial equipment with or without weight printer.

Write or phone for more information
PHONE NORTH 1231

TYPE CS—PORTABLE—PITLESS
Type CS scales, pitless installation, roller bearings, heavy duty, low maintenance. Capacities 15 tons thru 50 tons. Platform sizes 18' x 9' thru 40' x 10', wood or steel deck.



TYPE S—PIT SCALE
Type S scales, pit installation, roller bearings, heavy duty, low maintenance. Capacities 15 tons thru 60 tons. Platform sizes 22' x 9' thru 60' x 10' for wood or concrete decks.

WINSLOW GOVERNMENT STANDARD SCALE WORKS, INC.
4830 NORTH 25TH ST. TERRE HAUTE, IND.

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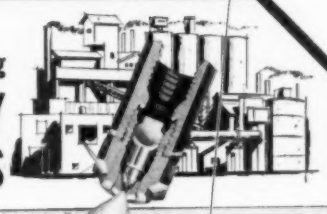
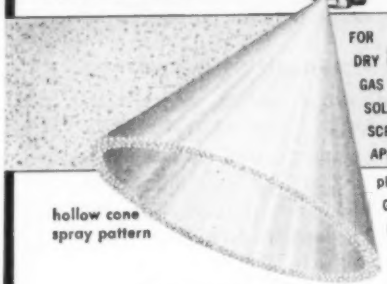
atomizing
SPRAY NOZZLES





FOR
DRY CEMENT MILL
GAS COOLING • HEAVY
SOLIDS REMOVAL and
SCRUBBER
APPLICATIONS
plus
GENERAL
DUST
CONTROL

HIGH EFFICIENCY spray nozzles that operate on hydraulic pressure alone and low water volume per hour. Provide even pattern distribution and excellent atomization. Made in stainless steel and brass for maximum service. Proved for performance in mill operation. Nozzles of all other types also supplied including pneumatic atomizing nozzles for every need.

SPRAYING SYSTEMS CO.
3224 Randolph Street • Bellwood, Illinois
FOR COMPLETE INFORMATION
write for Catalog No. 24

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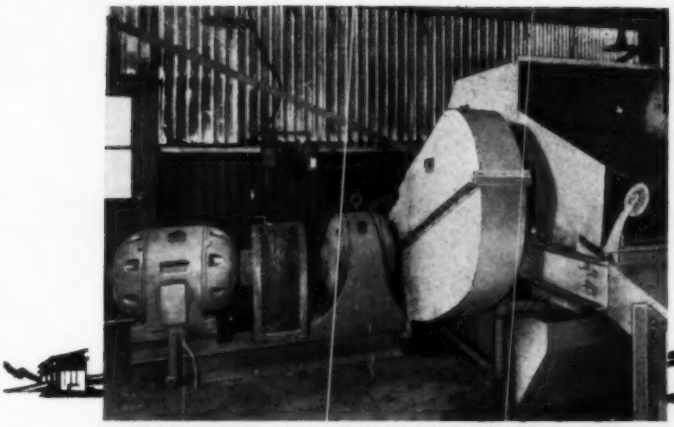
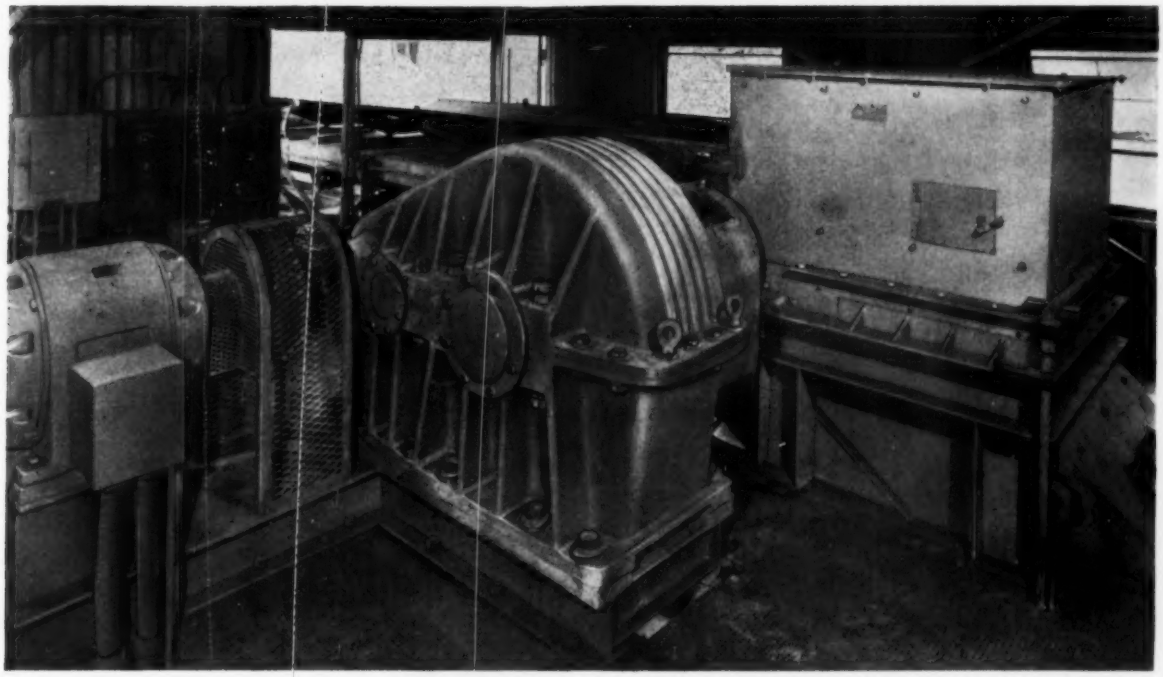
FOOTE BROS. DRIVES IN THE CEMENT INDUSTRY



...Move Cement Clinker at 2000 TONS PER HOUR

LINE-O-POWER Reducer Driving Tunnel Belt feeding Final Conveyor Belt.



MAXI-POWER Reducer Driving Final Conveyor Belt, Universal Atlas Cement Plant, Buffington, Indiana

Lake carriers get a fast turn-around when they load clinker at United States Steel Corporation's Universal Atlas Cement Plant at Buffington, Indiana, because the clinker loading belts driven by Foote Bros. Reducers have a maximum capacity of more than 4 million pounds per hour!

The 48" wide, 2445 ft. long inclined Final Conveyor Belt, driven by a Foote Bros. MAXI-POWER Parallel Shaft Drive, which is fed by two 36" wide Tunnel Belts equipped with LINE-O-POWER Drives, moves the fused raw material from mountain-high stock piles into the holds of boats at the rate of 2000 tons per hour.

This is tough, demanding service. Drives are subjected to massive shock and maximum peak loads... yet the Foote Bros. Drives have never been shut down for emergency repair or maintenance!

Dependability like this is a standard by-product of Foote Bros. drive know-how. Why not take advantage of our more than a century of experience and specialization in building high quality transmission products?

There's a Foote Bros. Drive made to meet your power transmission requirement. Ask your nearby Foote Bros. Authorized Distributor for information or assistance concerning your power transmission problems. He's ready to help you.

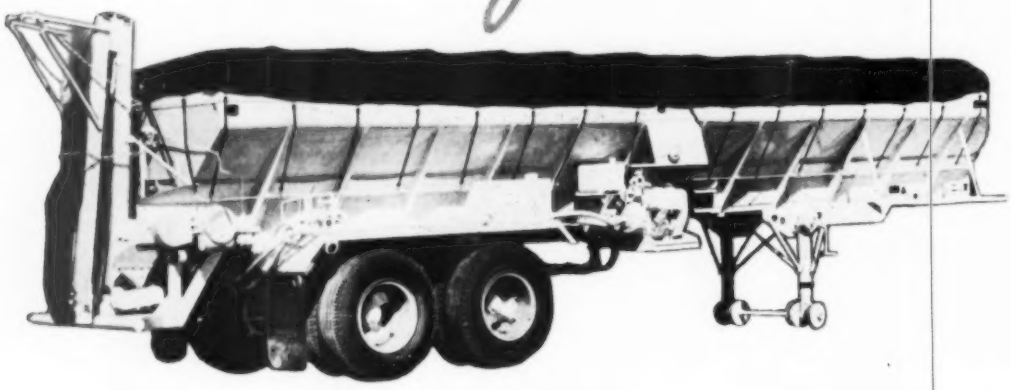
FOOTE BROS. GEAR AND MACHINE CORPORATION

4571 South Western Boulevard, Chicago 9, Illinois

POWER TRANSMISSION DRIVES

BULKMASTER by WINGER

WINGER BULKMASTER



What's your problem in bulk delivery?

The new Winger Bulkmaster Model FB-T shown above is designed to transport and self-unload **most** dry bulk materials . . . BUT if your problem is a tough one, let Winger **custom-engineer** the answer. Years of experience in the fabrication of steel, stainless steel and aluminum enable us to build equipment according to your exacting specifications. Write us or call for the name of your nearest Bulkmaster distributor.

A FEW CHOICE DISTRIBUTORSHIPS ARE AVAILABLE

Bulkmaster Quality . . . .
Your Guarantee of Service

WINGER
MANUFACTURING COMPANY
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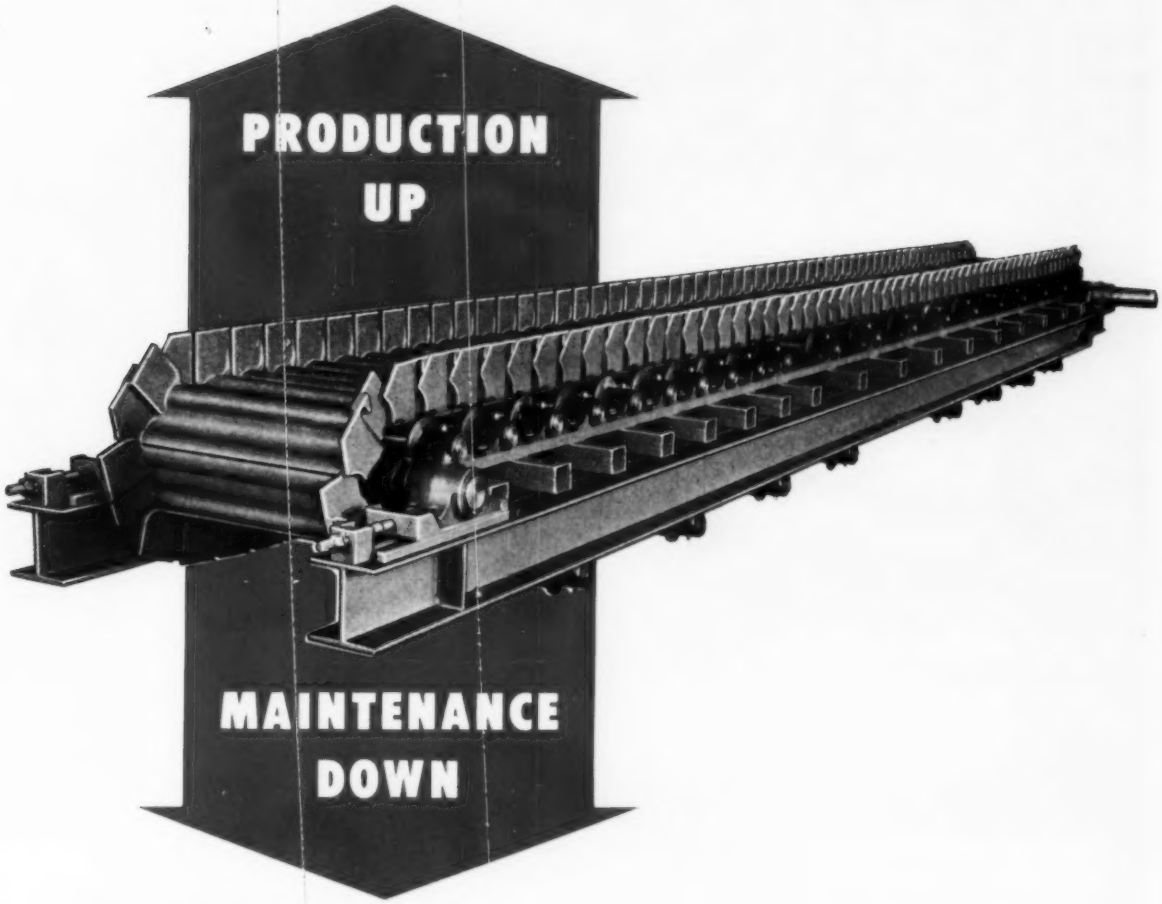

TISCO® PAN FEEDERS

Production up, maintenance down — costs down, profit up — a natural result of the durability and dependability of TISCO Pan Feeders.

Under the heaviest pounding and abrasion, vital manganese steel feeder pans, head sprockets, idlers, and rollers actually work-harden and increase their wear resistance while they continue to function smoothly. The result is increased profits — profits in the form of higher production rates and lower maintenance costs. More information is available. Write to:

TAYLOR-WHARTON CO.

DIVISION OF HARSCO CORPORATION
Established 1742
HIGH BRIDGE 3, NEW JERSEY
PLANTS: Cincinnati, O. — Birmingham, Ala. — Easton, Pa.
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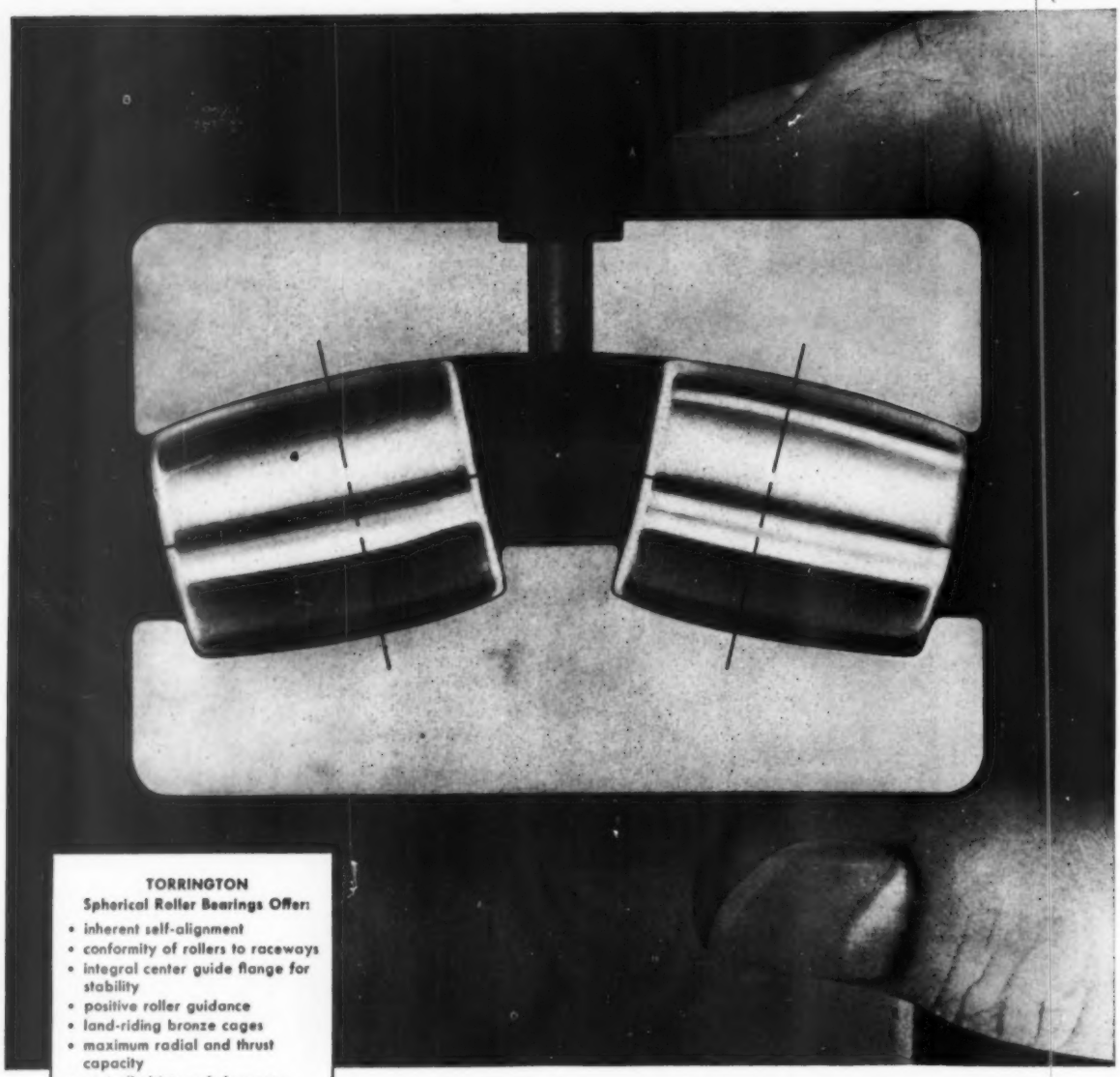


TORRINGTON
Spherical Roller Bearings Offer:

- inherent self-alignment
- conformity of rollers to raceways
- integral center guide flange for stability
- positive roller guidance
- land-riding bronze cages
- maximum radial and thrust capacity
- controlled internal clearance
- electronically selected rollers
- even load distribution
- long, dependable service life

Shaped for Stability!

The asymmetrical shape of each roller in Torrington Spherical Roller Bearings contributes directly to operating stability and long service life.

The maximum roller diameter is not at the center of the roller. Located towards the center flange, it insures geometric positioning of the roller for positive guidance with free rolling action.

The roller shape also approaches that of a tapered roller. Lines extended from the roller-to-race contact zone converge at the roller and bearing axes. This approach to true conical rolling action further assures stability.

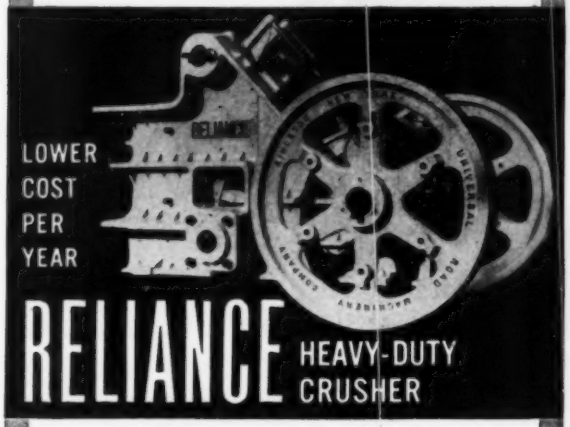
These are two more reasons why Torrington Spherical Roller Bearings operate cooler, quieter and with greater stability. For the ultimate in bearing performance and service life, always specify *Torrington* Spherical Roller Bearings. Send for new Torrington Spherical Roller Bearing Catalog #258.

progress through precision **TORRINGTON BEARINGS**

THE TORRINGTON COMPANY South Bend 21, Indiana • Torrington, Conn.

LEVER-TYPE JAW CRUSHER STILL IN USE AFTER 36 YEARS

—at Keystone, So. Dakota



RELIANCE HEAVY-DUTY CRUSHER

- Heavier, stable—you save money on upkeep.
- Minimum abrasion — outlasts other designs 3 to 1.
- Long jaw plates — adjustable for fineness.
- Crushing, screening and washing plants—50 to 1,500 tons-per-day capacity —engineered to your needs.

Booklet on request, pictures installations.

UNIVERSAL ROAD MACHINERY CO.

Main office and factory: Kingston, N. Y.
New York City office: 117 Liberty St.

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LAG PULLEYS RIGHT IN THE CONVEYOR WITH

Pulley Lagging Method

Fast — Economical — Convenient

The Minet Method of pulley lagging cold bonds tough, long-wearing Neoprene to your steel pulleys. No special tools or skills needed. No need to remove pulley — this means big savings in DOWN TIME.

An Economical Kit, containing all material needed, and complete installation instructions is available from stock. When ordering, specify thickness of lagging desired, and diameter and face width of pulley to be covered.

GENERAL SPLICE CORPORATION

32 Woodworth Ave. Yonkers, N. Y.
Phone: GReenleaf 6-2211

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STOP FUEL WASTE!

Rising costs of production and shrinkage of profit margin emphasize the continued need for economy at every possible point. You can save fuel and improve kiln operation by providing your Burner with a continuous record of oxygen, carbon dioxide, and combustibles in the flue gas. A continuous record of oxygen permits complete control of the air supply; combustibles analysis indicates oxygen demand under all conditions; the carbon dioxide record reflects the state of the calcining process. Diligent use of the Cambridge Gas Analyzer results in lower fuel consumption, more uniform product and dollars saved!

Records the whole story continuously on a single chart.

Send for literature

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NEW YORK 17, NEW YORK

CAMBRIDGE GAS ANALYZERS

PIONEER MANUFACTURERS OF PRECISION INSTRUMENTS

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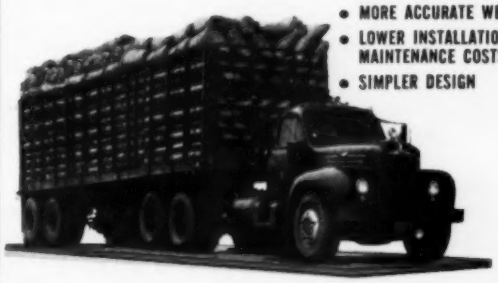
WEIGH THE FACTS . . .

You're Way Ahead with

MURPHY-CARDINAL

Welded Steel MOTOR TRUCK SCALES

- LONGER LIFE
- MORE ACCURATE WEIGHTS
- LOWER INSTALLATION AND MAINTENANCE COSTS
- SIMPLER DESIGN



Murphy-Cardinal Scales combine the strength of high tensile STEEL and the simplicity of ADVANCED DESIGN to bring you greater all 'round economy. Murphy-Cardinal's Double Link Suspension Bearings absorb heavy impacts and provide a sturdy, free floating platform of either concrete or timber. Capacities and platform sizes are available on request.

Write Dept. PQ For Complete Information

Cardinal SCALE MFG. CO.
P. O. Box 151 — Webb City, Mo.

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ADV 155

Longyear

PRODUCTS: Diamond core drilling equipment and supplies (center: *Unitized* Longyear "24" drill rig on 4-wheel-drive Jeep). . . Longyear multi-speed drilling pumps . . . Longyear diamond bits . . . Longyear Wire Line equipment.

WORLD WIDE SERVICES: *Contract Drilling*—Wire Line and conventional core drilling by experienced drill crews with modern equipment—to date: over 1 million feet with Wire Line . . . *Consulting*—Geological and mining consultation . . . Property valuation for loans, leases, and sale . . . Mineral exploration and appraisal.

E. J. LONGYEAR COMPANY
Minneapolis 2, Minnesota, U.S.A.

Member: Diamond Core Drill Manufacturers Assn.

CANADIAN LONGYEAR LTD., NORTH BAY, ONT./LONGYEAR ET CIE, PARIS, FRANCE/LONGYEAR N.V., THE HAGUE, HOLLAND/LONGYEAR de MEXICO, S.A. de C.V., SAN BARTOLO, MEXICO

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PLATEGRIP

PLATE FASTENERS FOR CONVEYOR BELTS

Make strong dust-tight, water-tight joints in belts of any width. Special design spreads tension uniformly across belt, allow natural troughing of belt and assures smooth operation over flat, crowned or take-up pulleys. Sizes for belts of from ¼" to 1½" thickness. *Write for Catalog Sheet.*

ARMSTRONG BRAY & CO.
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PIT and QUARRY on your desk is like a full-time consultant on your staff

DEPENDABLE FOR 60 YEARS

Woven Wire ALLOY SCREENS

TWIN CITY IRON & WIRE CO.
St. Paul, Minnesota

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CONTRACT CORE DRILLING

EXPLORATION FOR MINERAL DEPOSITS
INCLUDING URANIUM & LIMESTONE — ANYWHERE

FOUNDATION TEST BORING

GROUT HOLE DRILLING

Skilled crews and complete stock of core drills and accessory equipment maintained at all times

Core Drill Contractors for more than 60 years

JOY MANUFACTURING CO.
Contract Core Drill Division
MICHIGAN CITY, INDIANA

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WHICH FILTER BAG FABRIC FITS YOUR NEEDS?

Why not ask one of the largest manufacturers of industrial textiles? Albany Felt Company can furnish any fiber, in any fabric — and thus is in a position to make a *completely impartial* recommendation.

Your inquiry is invited. No obligation, of course.

ALBANY FELT COMPANY
INDUSTRIAL FABRICS DIVISION
MAIN OFFICE AND PLANT: ALBANY 1, N. Y.

ATTACH THIS COUPON TO YOUR LETTERHEAD — MAIL IT TODAY

ALBANY FELT COMPANY
INDUSTRIAL FABRICS DIVISION
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☐ Please send us your latest Filter Bag bulletin.

☐ Have your representative call to supply us with a free, scientific analysis of our filter fabric requirements.

STARSTEEL
HEAVY DUTY SPACE SCREENS

Here's why STARSTEEL better-made screens can cut your costs for screens and wasted downtime:

1. STARSTEEL's harder, tougher, specially alloyed high-carbon wire gives far longer resistance to abrasion and fatigue
2. STARSTEEL's tighter, more rigid weaving produces a perfectly flat surface that keeps openings accurate and prevents distortion
3. STARSTEEL's precision-formed hook strips or edge hooks permit tighter tensioning on machines, minimize breakage

Competitively priced STARSTEEL Screens step up production too; improve product uniformity and quality. *Write for catalog.*

QUICK SHIPMENT FROM STOCK
of most weaves, meshes, wire sizes

Star will produce screens or cloth from stainless or other steel alloys, Monel, brass, bronze, copper, aluminum or any metal that can be drawn into wire. Inquiries invited.

STAR WIRE SCREEN & IRON WORKS, INC.
2515 San Fernando Road • Los Angeles 65, Calif.

Subsidiary of Ludlow-Saylor Wire Cloth Company, St. Louis, Mo.

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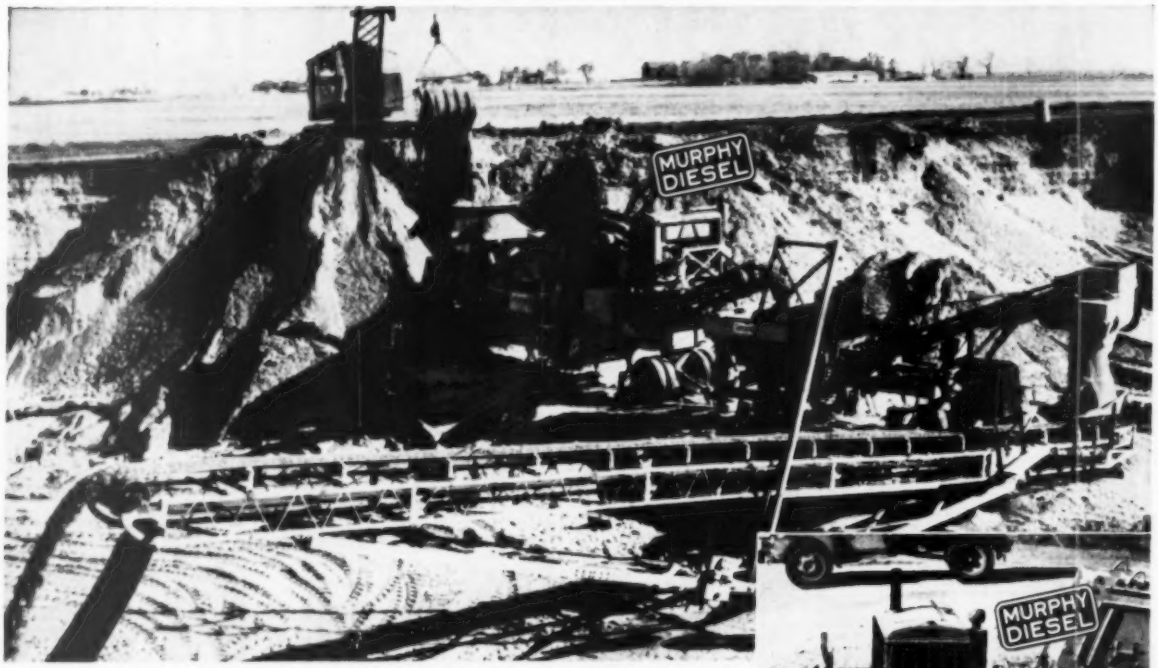
HERE'S HEAVY-DUTY WORKING POWER BY

MURPHY DIESEL

FOR A 2-MILLION TON PER YEAR AGGREGATE PLANT



A 133 HP (continuous) Murphy Diesel powers a Cedarapids Commander crushing plant in Larson's George Pit, near Joliet, Ill. This plant produces approximately 2200 tons of road aggregate per day.

Elmer Larson, Inc., of De Kalb, Illinois, one of the Midwest's largest aggregate producers, has produced around 25 million tons in the past 30-odd years. Owners Elmer and Leon Larson know the value of equipment that is engineered for *hard work*, with dependability and economy. That's why they chose Murphy Diesel power for the plants shown here.

Murphy Diesels give you the kind of *usable, hard-working* power you need, delivered into the job. Murphy power takes hold of a load and really hangs on. Murphys' good lugging power is the result of high rising torque. This helps keep your equipment at the right operating speed for efficient production and more profit. And Murphys get every ounce of power out of every drop of fuel. When you see your Murphy Diesel Dealer for proof, ask about low maintenance and economical operation, too.

At the Sears Pit, Sycamore, Ill., a 203 HP (continuous) Murphy Diesel powers a Cedarapids Double Impeller Impact Breaker primary. This pit produces 1700 tons per day of road rock, aglime, concrete aggregate, and stone chips.

MURPHY DIESEL

MURPHY DIESEL COMPANY

5307 W. Burnham St. • Milwaukee 19, Wis.

SALES—PARTS—SERVICE throughout the Nation

PUTS MORE POWER INTO THE JOB

MP Series Murphy Diesel engines and power units are available in sizes from 105 to 320 HP with engine speeds of 1200 and 1400 rpm. "Packaged" generating units are available with capacities ranging from 60 to 188 KW.

430-RO

NEW DU PONT "TOVEX"-GEL

Now Du Pont packs 5 blasting advantages into one low-priced explosive

Now you can get the blasting energy you need where rock is really hard to break—at a lower cost than ever.

New "Tovex"-Gel does not contain nitroglycerine. It is the only non-cap-sensitive, cartridged product that gives you maximum bore-hole density. It has successfully replaced even high strength gelatin dynamites on a pound for pound basis in many places.

You get five blasting advantages with this one new explosive on the job:

1. Better results—equal or superior to higher priced gelatin dynamites.

2. More safety. "Tovex"-Gel is safer than nitroglycerine dynamites.

3. No headaches. No nitroglycerine to cause them!

4. High bore-hole density. Gives more pounds per foot than most products on the market. Fills the entire cross-section of the hole with high density, hard-hitting explosive.

5. Reduced costs. "Tovex"-Gel is priced to give you maximum economy in your operations.

Your Du Pont Explosives representative or distributor will be happy to demonstrate "Tovex"-Gel for you. For details, call him or write: Du Pont, Explosives Department, 6440 Nemours Building, Wilmington 98, Delaware.

DU PONT "TOVEX"-GEL

REG. U. S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

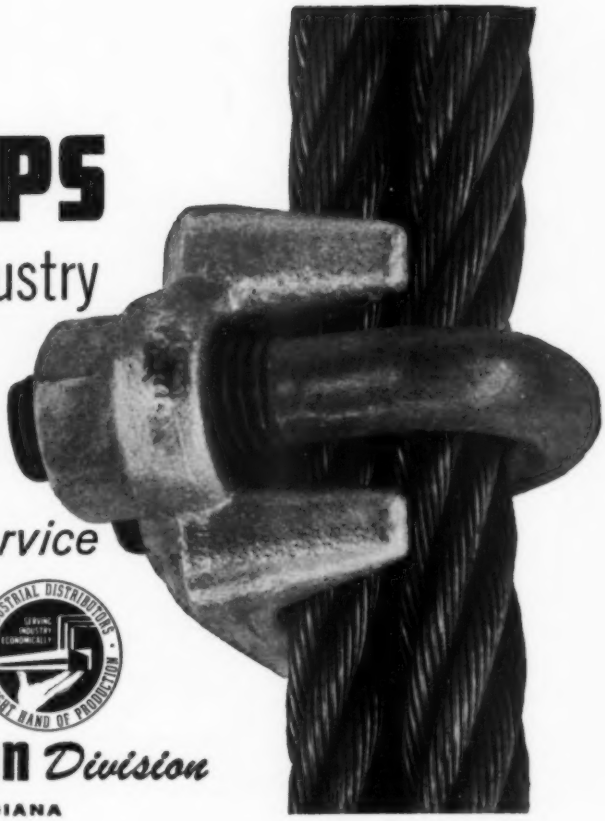
GENUINE

CROSBY CLIPS

Standard of the Industry

FOR GREATER SAFETY SPECIFY THE CLIP WITH THE RED U-BOLT.®

Proved in 75 years service



Ask your Crosby Clip Distributor for catalog listing the most complete line of forged fittings for wire rope and chain

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What they don't know will hurt them

They must have first-rate schools

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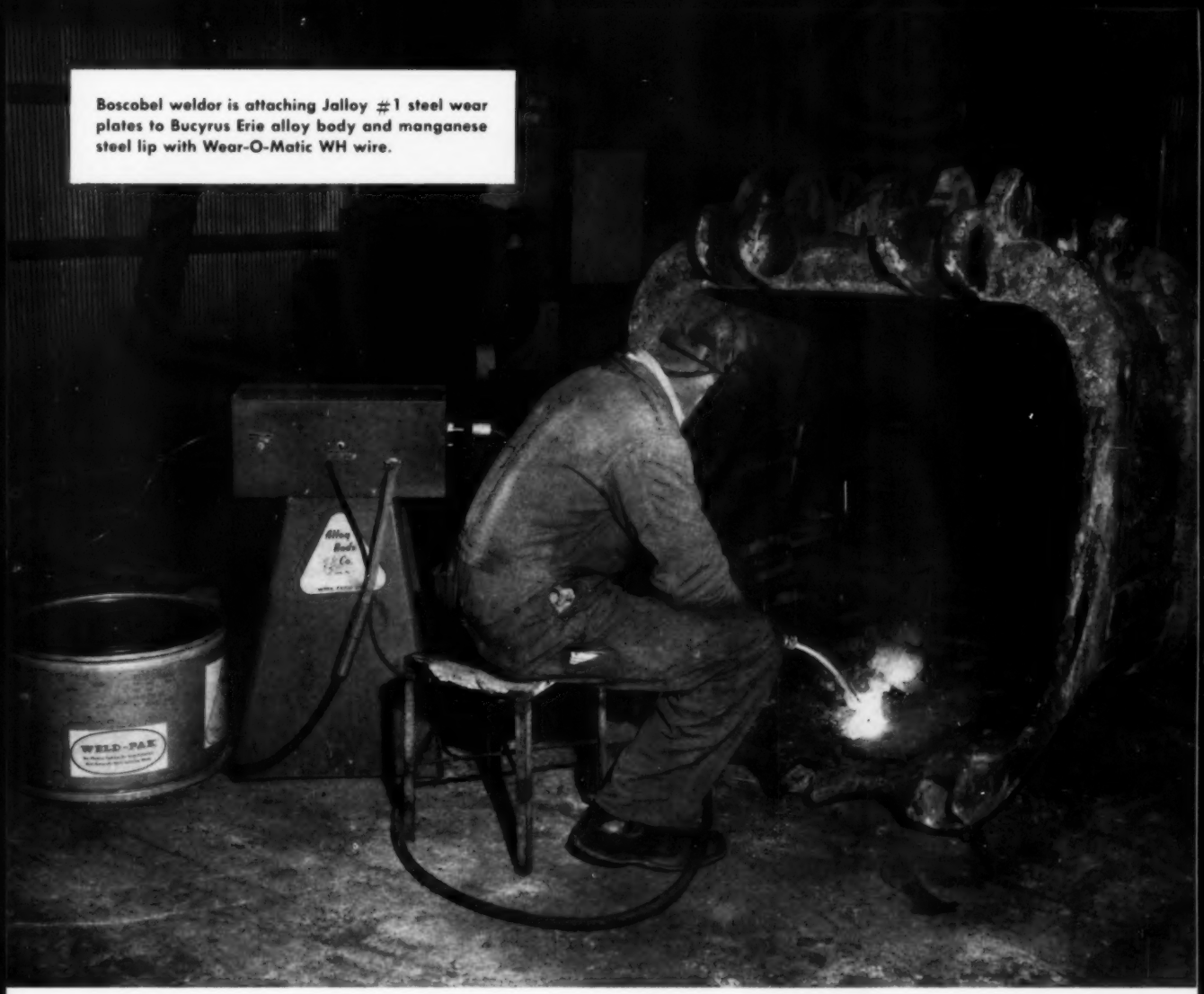
FREE BOOKLET tells how *you* can help make your school better. Based on the recent study by Dr. James B. Conant, former President of Harvard, it answers such questions as — "What courses should *all* students take?" "Should students be grouped by ability?" "When is a school too small?" and many more. For your free copy, and other helpful information, write: **Better Schools, 9 E. 40th St., N. Y. 16, N. Y. Do it today!**



Boscobel weldor is attaching Jalloy #1 steel wear plates to Bucyrus Erie alloy body and manganese steel lip with Wear-O-Matic WH wire.

35% Savings on bucket maintenance with NEW Wear-O-Matic WH welding wires

"Wear-O-Matic WH is the most versatile welding wire for bucket maintenance because it provides high strength welds in any of the popular alloy steels and has excellent resistance to impact when used for build-up work. Savings in time and labor through the semi-automatic open arc application of this wire have resulted in less bucket down time and lower costs."

L. ARDEN HENLEY, SUPT.
BOSCOBEL GRANITE CORP., MANAKIN, VA.

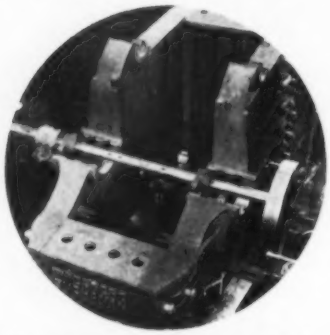
WHAT about bucket maintenance in your shops? Costs too high due to too many manual welding applications? The important benefit gained by Boscobel Granite was the elimination of manual welding with stainless steel electrodes to obtain the necessary high strength attachment welds for their rugged rock handling chores. These benefits can be yours whether you are welding manganese to manganese, manganese to carbon steel or either of these to any of the abrasion or impact resistance alloy steels. Then, without changing wires, your weldor can apply build-up deposits to lesser worn areas such as latch pins, keepers and lips . . . a deposit that will work harden to outwear manganese steel. To put more service life in the business end of your shovels and drag lines, investigate today the semi-automatic open arc application of Wear-O-Matic WH wires. You'll lower your maintenance costs . . . decrease down time and increase working life. For complete details, request Bulletin AR-21. Alloy Rods Company, P. O. Box 1828, York 32, Pa.

ALLOY RODS COMPANY

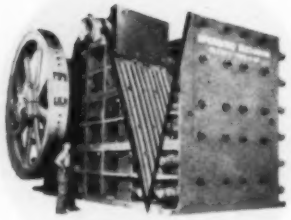
YORK, PENNSYLVANIA

SALES OFFICES AND WAREHOUSES • NEWARK, PITTSBURGH, PHILADELPHIA, BOSTON, CHICAGO, SAN FRANCISCO, EL SEGUNDO, CALIFORNIA — DISTRIBUTORS IN ALL OTHER PRINCIPAL CITIES

TWENTY YEARS OF LEADERSHIP IN THE DEVELOPMENT OF QUALITY ALLOY ARC WELDING ELECTRODES



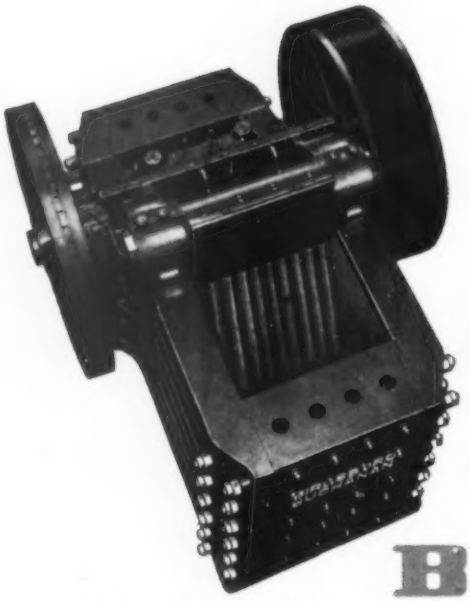
Deep, extra strong cast steel frames.



Longer, swing jaw for more acute crushing angle.

Rod type pitman, lighter and stronger, cuts power costs.

Offset toe lugs allow extra wear on jaw plates.



Entire crusher precision constructed for easy field assembly.

Interchangeable and reversible jaw plates for additional wear.

CR 28 60

BIRDSBORO-Buchanan Primary Crushers

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CORPORATION

STEEL MILL MACHINERY • HYDRAULIC PRESSES • CRUSHING MACHINERY • SPECIAL MACHINERY • STEEL CASTINGS
Weldments "CAST-WELD" Design • ROLLS: Steel, Alloy Iron, Alloy Steel • **BIRDSBORO, PENNSYLVANIA**

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Write for rate card.

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Used equipment, employment and professional ads only are eligible for classified advertising rates.

PIT & QUARRY
431 S. Dearborn St. Chicago 5, Ill.

BROADCAST

Section

ENGINEER QUALITY CONTROL

We are looking for an engineer who has quality control experience with concrete, aggregates and related materials to develop and maintain quality control specifications, methods and procedures in a multi-plant operation.

This is an outstanding opportunity which will provide the right man with an excellent salary and fine benefits.

If you are qualified and wish to be considered, send a complete resumé including salary requirements.

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ELECTRICAL ENGINEER EXCEPTIONAL OPPORTUNITY

We are offering the successful applicant for this position an excellent salary, fine benefits, including profit sharing and bonus, and advancement potential. Duties cover a wide range of electrical engineering functions, including design, developing projects costs. Supervision of installation and maintenance and maintaining electrical requirements for a multiplant operation. The successful applicant must in turn offer us a minimum of 3 to 5 years experience. A degree in electrical engineering is required. Forward a complete resumé and indicate salary requirements.

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Experienced man in rock crushing, pulverizing. Must have knowledge of plant layout, erection, maintenance, and other problems related to operation of crushing and pulverizing plant. Location southeast Michigan.

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Capable and experienced man needed to sell used heavy construction equipment who knows the market and outlets. The individual must be able to produce results on his own initiative.

This is a permanent position with good salary and benefits including profit sharing.

If you wish to be considered, forward a complete resumé including salary requirements.

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CHEMIST CEMENT PLANT

A midwest cement producer has opening for man to fill the position of cement plant chemist. Must be college graduate with degree in chemistry. Should have at least two years' experience in chemical process control, preferably in the cement industry. Excellent employee benefits. Please send complete resume including salary requirements.

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WANTED

PLANT SUPERINTENDENT

Man capable of assuming full operation of sand and gravel plant. Dredge operation—8" pump. Located in Northwestern Indiana. Please refer to

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ASSISTANT to GENERAL SUPERINTENDENT — YARDS

We are seeking a man preferably with an engineering background who has heavy experience in yard and redi-mix operations. This position provides an outstanding opportunity for the individual selected. He will report to the General Superintendent yards of a large multi-plant organization and work directly in the field in management capacity directing yard and redi-mix operations, developing and installing new procedures and equipment.

We offer excellent salary and outstanding benefits.

If you have the required background and wish to be considered, forward a complete resumé including salary requirements.

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431 S. Dearborn St. Chicago 5, Illinois

Wanted

To contact concrete pipe manufacturer interested in expanding their line to the fastest growing state in the Southwest. Will furnish interested party our state map showing present competitive plants and their material sources. Object selling aggregates. Will invest in properly financed company.

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431 So. Dearborn St. Chicago 5, Illinois

PACKHOUSE SUPERINTENDENT CEMENT PLANT

We want an experienced supervisor who can take full charge of modern cement packhouse handling cement in bulk and bags. Ours is a new, growing Eastern cement company and we have a real opportunity for the man who can take full charge of plant operation, machinery maintenance, receiving and shipping, by truck and rail.

Age 30-50.

Salary open.

Box No. PQ-339-E, c/o Pit and Quarry Publications
431 So. Dearborn St. Chicago 5, Illinois

POSITION WANTED

Quarry superintendent, 24 years experience, all phases crushed stone production. Results guaranteed.

Box No. PQ-251-E, c/o Pit and Quarry Publications
431 So. Dearborn St. Chicago 5, Illinois

PLANT CHEMIST *FOR* NEW CEMENT PLANT

This is an outstanding opportunity for a man who is now plant chemist in a cement plant and who aspires to be Chief Chemist. Ours is a growing Eastern company with a fine modern plant. Candidate must have college training and satisfactory experience record in control and production of portland cement.

Age 30-50.

Salary plus stock option.

Box No. PQ-340-E, c/o Pit and Quarry Publications
431 So. Dearborn St. Chicago 5, Illinois

MANUFACTURING EXECUTIVE

Mature Manufacturing Executive needed by medium sized, mid-western Corporation. Ability to supervise Fabricating Shop, Machine Shop and Assembly Plant essential.

This 62 year old company manufactures portable and stationary crushing equipment for the rock and gravel industry and made-to-order heavy mining equipment.

Box No. PQ-328-D, c/o Pit and Quarry Publications
431 So. Dearborn St. Chicago 5, Ill.

WANTED

A man capable of taking charge of the operating end of a dirt moving, gravel and ready-mix concrete business. This is a growing concern in the Pacific Northwest which did a million dollars worth of business in 1959. Write, giving full particulars as to experience, etc.

Box No. PQ-332-D, c/o Pit and Quarry Publications
431 So. Dearborn St. Chicago 5, Illinois

FOR SALE

Large Commercial Sand Deposit
Location, Florida

Box No. PQ-329-D, c/o Pit and Quarry Publications
431 So. Dearborn St. Chicago 5, Illinois

FOR SALE

1—27 ft. Boom & 23 ft. Sticks 2½ cu. yd. Shovel Bucket for Model 3500 or 3000 Manitowoc. Located Eastern Ohio. Excellent condition. Trailer Loading. 1 only 45 ft. Boom for 3500. Excellent Condition.

Box No. PQ-341-E, c/o Pit and Quarry Publications
431 So. Dearborn St. Chicago 5, Illinois

Professional Services

CORE DRILLING
Quarry & Mine Exploration

ERECO
DIAMOND CORE DRILLING COMPANY
Thomasville Pennsylvania

E. E. Cooke, Proprietor
Telephone: YORK, PA. 7305 or 5881

J. H. ROBINSON AND ASSOCIATES LTD.
CONSULTING ENGINEERS,
SPECIALISTS IN LIME & GYPSUM DESIGN AND OPERATING PROBLEMS
53 YORK ROAD, WILLOWDALE, ONTARIO

M. F. PARSONS
Consulting Engineer
Specializing in Lime and Lightweight Aggregate, Plant Design and Operation
Box 550 Montreal
St. Bruno, P.Q. OL 3-2436

CORE DRILLING ANYWHERE
We look into the earth
PENNSYLVANIA DRILLING COMPANY
PITTSBURGH 22, PA.

CORE DRILLING
MINERALS CLAYS LIMESTONE
FOUNDATION TESTING
BUILDINGS HIGHWAYS
THOMASVILLE DRILLING & TESTING CO.
THOMASVILLE, PENNA.

We do
CONTRACT DRILLING
Anywhere
SPECIALIZING IN QUARRY BLAST HOLES USING
INGERSOLL-RAND DRILLMASTERS
Hole sizes from 4¾" through 6½"
NEW JERSEY DRILLING COMPANY
Box 281, Route 206, Netcong, N. J.
NEtcong 3-2250

INCREASE YOUR BUSINESS!
Run Your Professional card in this space

WISSER AND COX
APPLIED GEOLOGY
FOR
UNDERGROUND & QUARRY PROBLEMS
exploration - evaluation
55 New Montgomery San Francisco, California
YUkon 2-1436 cable: GEOLOG

Quarries
Crushing Plants
Cement Plants
Storage Methods
Operating Costs

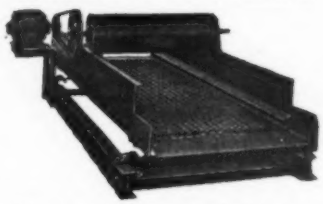
E. Lee Heidenreich, Jr.
Consulting Engineers
75 Second St.
Newburgh, N. Y.
JO 1-1828 (Code 914)

Construction
Design
Operation
Plant Layout
Appraisals

BONDED® VIBRATING SCREENS

PROMPT SHIPMENT OF ALL MODELS

GENERAL DUTY SCREENS

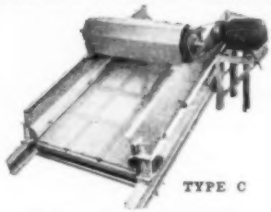


PERFECT BALANCE AND SHARP ACTION. Eccentric weight mechanism, spring mounted, 1 to 3 decks, 2' x 4' to 3' x 8'. **WRITE FOR "SEVEN SECRETS OF SUCCESSFUL SCREENING" IN BULLETIN NO. 1036.**

For the accurate and economical screening of sand, gravel, crushed stone, ores, broken rock, slag, clay and cement products and lightweight aggregates. All Bonded Screens built of structural steel welded and reinforced with additional members on all points of strain and factory tested and balanced. Available in enclosed models where dust and flying particles need to be contained. For almost any type of screening operation, wet or dry.

Priced from $443

SPECIAL SERVICE SCREENS



WRITE FOR BULLETIN #1224

For scalping middle-range pieces and accurate sizing of fines and above listed products but where quantity and feed do not warrant a larger capacity, heavy duty model. Medium to heavy construction. Can also be suspended from four steel cables and springs for portable or temporary installation. Vibration remains in working screen body. No shaking of tipple, building or platform.

Priced from $487

HEAVY DUTY SCREENS

FACTORY BALANCED CONTROLLED VIBRATION. Four bearing positive throw eccentric shaft; 3' x 6' to 5' x 14'. 1 to 5 decks. **WRITE FOR BULLETIN NO. 1087 AND 9 REASONS WHY BONDED IS YOUR BEST BUY.**

For high tonnages, heavy scalping and multiple sizing of such minerals and industrial products as handled by above models. No dead spots. Springless live-rubber mounting of screen body controls vibration. Screen cloth and plate in all models reversible for longer life. Their finished edges prevent plates from splitting and cloth from ravelling.

Priced from $1620

BONDED SCALE AND MACHINE COMPANY
110 BELLEVUE COLUMBUS 7, OHIO
PHONE: Days, HI 4-2186 Evenings: AX 1-2213

BONDED QUALITY BARGAINS

CURRENT MODELS - IMMEDIATE SHIPMENT FROM OUR FACTOY - WRITE, WIRE OR PHONE FOR FREE CATALOG AND PRICES

BONDED TROUGHING IDLER CONVEYOR BARGAINS

8" Jr. I Beam Frame Conveyors

Truss Frame Conveyors

Built Like A Bridge For High Tonnages Clear Spans to 50 Ft.

Any Length - Any Belt Width. Complete Pre-Fab sections of 8" Jones & Laughlin Jr. I Beam Frame Conveyors quickly and easily joined together on the job. These beams are rolled with .20% Copper Content. Atmospheric exposure tests disclose that Junior Beams with .20% Copper have as much as four times the resistance to corrosion as non-copper steels. Braced with structural angle, welded to frame for maximum rigidity. Equipped with 5" roll diameter idlers and return rolls, 20" diameter head pulley and 16" diameter tail pulley, mounted on 2¼" or 2 7/16" diameter shaft.

We take our loss on our stock of short length belting. You can save as much as 50% on BONDED CONVEYOR SPECIALS, with conveyor belting in two pieces. Belt is new 4-ply, 28 oz. duck, ⅛" top rubber cover x 1/32" bottom cover Major grade belt and is Fresh Stock made by leading manufacturers. **WRITE FOR BULLETIN #1138.**

Bonded troughing idler conveyors also available in Truss Frame Construction. **WRITE FOR BULLETIN #1169 AND PRICES.**

8" JR. I BEAM CONVEYOR PRICES

CONVEYOR PRICES INCLUDE BELTING

Belt Width	Length of Conveyor	List Price	Sale Price	Add or Deduct Per Foot
14"	25'	$1425	$ 753	
14"	50'	2268	1182	$17.18
14"	85'	3445	1783	
16"	20'	1287	880	
16"	45'	2180	1140	
16"	60'	2715	1416	$18.40
16"	90'	3786	1969	
18"	25'	1507	813	
18"	45'	2261	1206	
18"	70'	3205	1696	$19.62
18"	85'	3771	1991	
18"	100'	4337	2285	
18"	130'	5469	2873	
20"	25'	1547	852	
20"	60'	2940	1579	
20"	75'	3536	1891	$20.78
20"	90'	4133	2202	
24"	25'	1622	916	
24"	45'	2479	1361	
24"	70'	3550	1916	$22.22
24"	100'	4835	2583	
24"	120'	5692	3026	
24"	150'	6977	3693	
30"	50'	2969	1649	
30"	70'	3948	2154	$25.25
30"	90'	4928	2659	
36"	25'	1854	1140	
36"	45'	2915	1711	$28.51
36"	60'	3711	2138	
36"	100'	5832	3278	

Other lengths and belt widths priced upon application.

BONDED 30" DEEP TRUSS CONVEYORS also built in heavy duty Portable Models. Available with Screen and Feeder and with mast or mastless type undercarriage and hydraulic powered mechansim. Lengths to 60 feet and belt widths through 30 inches. Equipped with Tow Hitch for easy moving from one job-site to another.

PRICED FROM $2365.

FREE! FREE!

For A Limited Time Only! You Must Say You Saw This Ad And Then

With every belting purchase of $300.00 or over, you will receive ABSOLUTELY FREE your CHOICE of ONE PAIR OF CARRYING or RETURN GUIDE IDLERS or ONE TROUGHING IDLER of the corresponding belt width as described below.

MAJOR BRAND: 12# to 15# Average Friction Pull. 800# to 1000# Average Cover Tensile. Heavy duty 4-ply, 28 oz. duck, ⅛" top rubber cover x 1/32" bottom rubber cover belting having high tensile strength, tough cotton duck, strong carcass and proper flexibility. Used in moving boxes, bags, coal, sand, gravel, crushed stone, refined sugar, salt, coke, earth and similar materials when abrasion is not too severe.

Width	Ply	List Price Per Ft.	Sale Price Domestic Per Ft.
14"	4	$3.78	**$2.94**
16"	4	4.24	**3.09**
18"	4	4.69	**3.42**
20"	4	5.17	**3.95**
24"	4	6.08	**4.43**
30"	4	7.47	**5.42**
36"	4	8.85	**6.43**

Major Bee Brands: 16# to 19# Average Friction Pull. 2400# to 3000# Average Cover Tensile, Skim Coat Between Plies. A high grade of heavy duty 4 and 5-ply, 28-oz. duck, ⅛" top rubber cover x 1/32" bottom rubber cover. These belts are for more severe service, high tonnages and abrasion resistance. For hauling stone, mineral ores, concrete, cement, coal and other similar materials, both wet and dry. Belts have molded rubber edges.

You Pay The Sale Price

Width	Ply	List Price Per Ft.	Domestic Sale Price Per Ft.	Imported Sale Price Per Ft.
14"	4	$ 4.48	**$3.18**	**$2.98**
16"	4	5.04	**3.60**	**3.14**
18"	4	5.61	**3.98**	**3.47**
20"	4	6.14	**4.54**	**3.99**
24"	4	7.22	**5.14**	**4.50**
30"	4	8.87	**6.31**	**5.58**
36"	4	10.49	**7.64**	**6.50**
24"	5	8.47	**6.01**	**5.25**

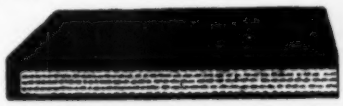
Major B-X Smooth Surface, 20# to 24# Average Friction Pull. 3400# to 4000# Average Cover Tensile. Skim coat between plies. 28 oz. duck. A heavier duty belt with ⅛" top cover x 1/32" bottom cover. For the higher abrasion resistance applications and handling of materials where more strength is required to give greater belt life.

You Pay The Sale Price

Width	Ply	List Price Per Ft.	Domestic Sale Price Per Ft.	Imported Sale Price Per Ft.
16"	4	$ 5.70	**$3.93**	**$3.31**
18"	4	6.34	**4.37**	**3.64**
20"	4	6.95	**4.98**	**4.02**
24"	4	8.18	**5.63**	**4.71**
30"	4	10.09	**6.92**	**5.80**
36"	4	9.47	**8.16**	**6.84**

TESTED COVEYOR BELTING *

WE PAY FREIGHT ON 200 POUNDS OR OVER PLUS AN ADDITIONAL 10% SAVINGS FROM SALE PRICE FOR FULL ROLLS 500 TO 650 FEET.



Major C-Bee Brand, Smooth Surface, 15# to 17# Average Friction Pull. 1600# to 2400# Average Cover Tensile. Skim coat between plies. Heavy duty belts for more severe service, high tonnages and abrasion resistance. 4 ply, 28 oz. duck. For handling stone, mineral ores, concrete, cement, coal and other similar materials both wet and dry. Belts have molded rubber edges.

Width	Top Cover	Bottom Cover	List Price Per Ft.	Sale Price Imported Per Ft.
14"	1/8"	1/32"	$ 4.35	**$2.96**
16"	1/8"	1/32"	4.92	**3.12**
18"	1/8"	1/32"	5.45	**3.44**
20"	1/8"	1/32"	5.97	**3.97**
24"	1/8"	1/32"	7.03	**4.46**
30"	1/8"	1/32"	8.62	**5.56**
36"	1/8"	1/32"	10.20	**6.45**
The Following Belts Are 5 Ply, 32 Oz. Ducks:				
24"	1/8"	1/16"	$ 9.17	**$5.33**
30"	1/8"	1/16"	11.27	**6.59**
36"	3/16"	1/16"	15.23	**8.45**

*** All belting is tested by the Engineering laboratory of one of the largest universities in the United States. It is guaranteed to meet or exceed listed specifications.**

Other widths, plies, duck weights and cover thickness available at low prices.

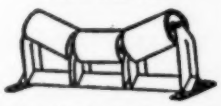
WRITE FOR FREE SAMPLE & BULL. #1283

CARRYING BELT & RETURN BELT GUIDE IDLERS

Carrying Belt Guide Idler $29.00 Per Pair

Return Belt Guide Idler $15.50 Per Pair

BONDED® IDLERS & RETURN ROLLS FOR UTMOST ECONOMY ON THE JOB



3-roll, 5" diameter Troughing Idlers for:			
14" belt	**$19.75**	24" belt	**$23.75**
16" belt	**20.50**	30" belt	**23.85**
18" belt	**21.90**	36" belt	**24.90**
20" belt	**22.10**	48" belt	**27.50**
1-roll, 5" diameter Return Rolls for:			
14" belt	**$ 8.50**	24" belt	**$11.00**
16" belt	**9.00**	30" belt	**12.50**
18" belt	**9.50**	36" belt	**13.75**
20" belt	**10.00**	48" belt	**16.50**

All steel. Interchangeable with other well-known makes. Furnished with replaceable prelubricated sealed ball bearings. Maintenance is negligible. **WRITE FOR BULLETIN #1138.**

BONDED SCALE AND MACHINE COMPANY

PHONE Days: Hickory 4-2186 **WRITE FOR FREE CATALOG AND PRICES** **PHONE Evenings: AX. 1-2213 or TEmple 7-4519**

110 BELLEVUE Mfrs. of Scales, Conveyors, Conveyor Parts, Idlers, Vibrating Screens, Crushers, Feeders and Bucket Elevators **COLUMBUS 7, OHIO**

ELECTRIC AIR COMPRESSORS
9—Ingersoll-Rand, 3000', 2200', 1300' & 198'
DIESEL LOCO CRANE
25-ton Industrial Brownhoist with D13000 Cat. diesel & 60 ft. boom
DIESEL LOCOMOTIVES
7—25 ton, 4—45 ton, 1—65 ton, 1—80 ton, 2—100 ton General Electric
9—8, 12, 15 & 30-ton Plymouth
DUMP CARS
300—1½, 3, 5, 16 & 20 yds. cap.
20-TON STIFF LEG DERRICK
96' boom, 40' mast, 50' S. legs, 39'10" sills, 16' built wheel
BALL MILLS
2—5' x 8' Kennedy Van Saun Air Swept Tube Mills
7' x 15' Marcy Grate Discharge 300 HP motor
HARDINGE CONICAL BALL MILLS
4'6" x 16" 6' x 36", 8' x 36", and 10' x 48"
ROD MILLS
6' x 12' Hardinge EPD 200 HP
7' x 15' Marcy Open End 300 HP motor
TUBE MILLS
6' x 15' Allis Chalmers Grate Discharge
7' x 18' Patterson with motor & reducer
7' x 24' Bethlehem and Foundry
HAMMERMILLS
5060 Dirie "Irogol" 500 HP
2—HMH-04-NC Hammermills, traveling breaker plate
3XE Gruendler 30" x 48"
8NF-14 Pennsylvania 400 TPH
JAW CRUSHERS
10" x 16" Pioneer, bronze bearings NEW
14" x 28" New England Road Machinery
22" x 56" Cedar Rapids Roller bearing
30" x 36" Traylor Type "H"
32" x 40" Cedar Rapids with feeder & motor
36" x 42" Farrell Bacon (in Canada)
48" x 72" Buchanan Type "CV"
56" x 72" Traylor (4 piece frame)
ROLL CRUSHERS
24" x 16" Cedar Rapids Double Roll
30" x 18" Cedar Rapids Double Roll
18" x 18" McLanahan & Stone Double Roll
42" x 16" Allis Chalmers Double Roll
CONE AND FINE REDUCTION
No. 1 Sturtevant
No. 19 Kennedy Van Saun
No. 122 Allis Chalmers Hydrocone
No. 28 Telsmith Intercone
7" Symons Standard Cone
No. 37½ Kennedy Van Saun
GYRATORY CRUSHERS, PRIMARY
12" Kennedy Van Saun
16" Allis Chalmers Superior McCully
20" Allis Chalmers Superior McCully (2) new 1948
25B Telsmith Primary Breaker
No. 11 McCully
PORTABLE CRUSHING AND SCREENING PLANTS
No. 2A Cedar Rapids Secondary, 24" x 16" Rolls, 3' x 8' 1½ deck screen, 40TPH
No. 61E Austin Western, 10" x 24" Jaw, 3' x 10' Screen, and electric motors
101 Austin Western 10" x 36" Jaw, 30" x 18" Rolls, 3 deck screen, and Murphy Diesel Engine
CONVEYOR—NEW
24" x 95' H.R. 42" Truss, with feeder Frame
VIBRATING SCREENS
4' x 8' & 5' x 10' Symons Rod Deck
4' x 10' Hewitt Robins Double Deck
5' x 12' Hewitt Robins Double Deck
CLASSIFYING AND WASHING EQUIPMENT
7' x 30' Eagle Twin Log Washer
84" x 12' Telsmith Super Scrubber
12'0" Link Belt Dewatering Rotoscope UNUSED
8' x 48" Hardinge Conical Scrubber
Size 10 Sand Settling Tanks (2)
20" x 15' Telsmith Twin Screw Sand Classifier
66" x 35' Telsmith Sand Drags (2)
ROTARY DRYERS
5' x 30' Ruggles Cole Model XA-8
5'6" x 60' Dryer or Cooler
8' x 60' reconditioned, ½ welded shell
3—10' x 78'—⅜" shell
2—7' x 45' Link Belt—½" shell
ROTARY KILNS
9' x 160' Allis Chalmers with burner
6' x 72' ⅝" Shell, gear train drive
2—7' x 45' Link Belt—½" shell

R. C. STANHOPE, INC.
60 E. 42nd St. New York 17, N. Y.
Tel.: MU. 2-3075 or MU. 2-1898

IMPACTORS	Penna CA3-38 and CF3-32
SCREEN	Telsmith 2 deck 3' x 10'
SCREEN	Telsmith 3 deck 3' x 10'
SCREEN	Deister 2 deck 4' x 12'
SCREEN	Rotex Sifter 5' x 7'
PUMPS	Deming 6 x 5 and 5 x 4
SHOVEL	Lorain 75B 1¼ yd Diesel engine
SHOVEL	Lorain L57 1¼ yd Diesel engine
CRANES	Michigan Truck TMCT-16 ¼ yd

G. & W. H. Corson, Inc.
Plymouth Meeting, Pa.

"OUTSTANDING VALUES"

2—Rotary 6' x 50' Flame Dryers, ½" shell. W/Mtrs., Fans, Cyclones
2—Eimco 8' x 12' Rot. Vac. Filters, Closed Steel Drums, Agit. trough
2—Raymond 4 Roller Hi Side Mills, Model 5047. Dbl. Cone Separator
1—St. Regis Model 160 FB 2 spout Valve Bag Filler, w/Feeder
1—Rotary Kiln 30" x 28' long. Skid mounted, 4" brick
1—Hardinge Double Rake Thickener Mechanism, 25' Bridge, ¾ HP
1—Raymond size 50 Imp Mill, with new hammers.

For immediate quote, wire or phone collect—GA 1-1380

MACHINERY AND EQUIPMENT COMPANY
123 Townsend St. · San Francisco 7, California

OPERATIONS FOREMAN
for Block and Concrete Plant
Progressive North Florida City

Must be capable of handling full supervision of Besser or Bergen Block Plant—Concrete Plant — Material Handling—Concrete and Block Delivery Equipment. Strong knowledge of Equipment is necessary. Mechanic background is preferable. Please give full details.

Box No. PQ-326-D, c/o Pit and Quarry Publications
431 So. Dearborn St. Chicago 5, Illinois

POSITION WANTED
PROJECT MANAGER

15 years supervisory experience in expansion and construction of rotary kiln plants and associated installations, in direct employ of the industry. 7 yrs. additional experience in heavy industrial building with engineering and contracting firms. Can organize and perform work with plant forces, or supervise contractors. Experienced in planning and design. Available in 30 days.

Box No. PQ-335-D, c/o Pit and Quarry Publications
431 So. Dearborn St. Chicago 5, Ill.

CHEMIST
for
CEMENT PLANT

Experienced Cement Plant Chemist. A growing western cement company has an opening for a plant chemist. A chemical degree and approximately five years experience in control and production of portland cement are required. Salary open.

Box No. PQ-310-B, c/o Pit & Quarry Publications
431 So. Dearborn St. Chicago 5, Illinois

WANTED

Sand and Gravel Operation. Must have ample reserves, sound and growing market, and priced attractively. *Write full particulars to:*

Box No. PQ-348-E, c/o Pit & Quarry Publications
431 So. Dearborn St. Chicago 5, Illinois

Aggregate Plant Manager

Ten years experience in all phases of aggregate business. Successful record. Presently employed. Desires to affiliate with good company on profit sharing basis or stock option.

Write to:
Box No. PQ-349-E, c/o Pit and Quarry Publications
431 So. Dearborn St. Chicago 5, Illinois

HEAVY EXCAVATION EQUIPMENT
DRAGLINES, SHOVELS, CRANES, DRILLS, TRUCKS

15-W B.E. Elec. Drag, 215', 12 yd.
450-W B.E. Diesel Drag, 165' w/extra 10, 12, 13 and 14 yd. buckets
9-W B.E. Elec. Drag, 165', 10 yd.
9-W B.E. Diesel Drag, 165', 12 yd.
7-W B.E. Diesel Drag, 140', 7 yd.
7400 Marion Diesel Drag, 175', 13 yd.
71-B B.E. Crane with 160' boom
625 Page Diesel Drag, 150', 10 yd.
621-S Page Diesel Drag, 125', 7 yd.
200-W B.E. Diesel Drag, 125', 6 yd.
2400 Lima Elec. Drag, 130', 6 yd.
2400 Lima Diesel Drag, 130', 6 yd.
4500 Manitowoc Drag, 120', 5 yd.
120-B B.E. Elec. Drag, 115', 5 yd.
111-M Marion Drag, 100', 4 yd.
1601 Lima 4 yd. Shovel/Drag
3900, 3500 & 3000 Manitowoc Cranes
5560 Marion 2½ yd. Elec. Shovel
151-M Marion 7 yd. Elec. Shovel
1600 P&H 6 yd. Elec. Shovels
170-B B.E. 6 yd. Elec. Shovel
4161 Marion 6 yd. Elec. Shovel
2400 Lima 6 yd. Std. & H.L. Shovels
120-B B.E. 4 yd. Elec. Shovel
4500 Manitowoc 5 yd. H.L. Shovel
1201 Lima 3½ yd. Standard Shovel
111-M Marion Standard & H.L. Shovels
3500 Manitowoc Standard & H.L. Shovels
54-B B.E. Standard & H.L. Shovels
Model T-650 RICHdrill Truck Mtd. Rotary and Down-The-Hole
Ingersoll-Rand Truck Mtd. & Crawler Mtd. Drillmasters
McCarthy & Compton Coal Auger Drills
Euclid Trucks, Dozers, Attachments, etc.

FRANK SWABB EQUIPMENT CO., INC.
313 Hazleton National Bank Bldg.
Hazleton, Pa. GLadstone 5-3658

(New)
GENUINE INGERSOL RAND ROCK BITS
1/3 Reg. Price

Types 1 & 2 Tirand. Side Hole & Center Hole. Sizes 1½", 1⅝, 1¾, 1⅞, 2, 2⅛, 2¼, 2⅜, 2½.
Lots of 50 or more 20c each up to 2"
LOTS of 50 or more 25c each up to 2½"

Additional discount 10% on 500 or more, 20% on 1000 or more.

Exceptional Value—Stock up now, while Supply Lasts
WENZEL MACHY. CO., 565 S. 10th
KANSAS CITY, KANS. MAYFAIR 11710

A LARGE AUCTION

CRUSHING - ASPHALT & CONSTRUCTION EQUIPMENT

SATURDAY, JUNE 11, 8:30 A.M. (MST)

ALBUQUERQUE, NEW MEXICO

NOTICE: Henry Thygesen, owner of Henry Thygesen & Company, is quitting the general construction business and selling all of their construction equipment, large and small. Henry Thygesen is one of the long established, large contractors of the Southwest. He is retiring from the general construction business.

LOCATION: The sale will be held at the Thygesen yard No. 2 which is located just off the 400 block on North Edith Blvd. or off of Hiway 422 at the Smith Asphalt plant. The location is in the North part of Albuquerque.

WRITE - WIRE - CALL Auctioneers for complete sale Listing!!!

EACH & EVERY PIECE POSITIVELY SELLS TO THE HIGHEST BIDDER WITHOUT ANY MINIMUM OR RESERVATION WHATSOEVER — REGARDLESS OF PRICE!!!

ALL OF THIS EQUIPMENT IS OWNED BY THE HENRY THYGESEN COMPANY

CRUSHING PLANTS: CEDAR RAPIDS Model 5AGR portable Primary Crushing plant, 25x40, complete w/Cat power; CEDAR RAPIDS Commander tandem portable crushing and screening plant 10x36 jaw, 30x25 roll; UNIVERSAL Model 880 Super portable crushing and screening plant, 10x36 jaw and 24x40 roll; CEDAR RAPIDS Master Tandem portable crushing and screening plant, 10x36 jaw and 40x22 roll; CEDAR RAPIDS Baby Tandem portable crushing and screening plant. The crushing plants are from good to excellent condition.

ASPHALT PLANTS: PIONEER Model 81 Asphalt Plant, has No. 88 mixer and gradation unit, completely portable, electrically operated; MADSEN 3000 lb. pugmill Asphalt plant, portable. Both plants are complete and in very good condition.

There is a complete line of asphalt equipment including pavers, rollers, spreaders, heaters, distributors, etc.
Earth moving equipment includes Cat DW-15 and DW-20 motor scrapers; Allis Chalmers, IHC and Euclid motor scrapers; Cat D-9 Tractor; (8) Cat D-8 Tractors; (5) Allis Chalmers HD21 tractors; Cat D-7 and many wheel Tractors; Cat and other pull scrapers; Hough "HF" loader; Allis Chalmers HD6G, HD11G and HD16G loader tractors; Cat No. 6 loader; (7) Cat No. 12 motor graders (2) 70D series, (4) 8T's and 1-7T; concrete equipment includes CS Johnson model 20 weigh batcher; portable travel batcher, model 3A; pumpcrete and other concrete pieces.

SCHIELD BANTAM truck crane w/hoe attachment; Cat D-8 w/500 comp and twin drifter drills; (5) Cat diesel electric sets; (5) Cat power units; (2) 50 ton compactors; grid roller and dble drum sheepfoot rollers; (4) Compressors, 210 to 500 cfm; (5) sets of portable truck scales from 15 ton to 30 ton; there are lube and welder trucks; McK Terry 11B3 pile hammer; there are extra conveyors and aggregate feeders; 35 ton tandem lowboy; (2) 20 ton tandem lowboys; '57 Mack tandem diesel truck tractor; Mack LJSWX tandem diesel truck tractor; single axle truck tractors; (9) dump trucks, 2—'58 Mack tandem, 3—'59 Chev w/5 yd beds, and others; tandem axle water trucks; flatbed trucks and pickups; floats, tank and van trailers and many small items.

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2—Louisville SS rotary dryers, 8' x 50', complete with drives, motors, fans, blowers, etc.
1—Traylor 11' x 155' rotary kiln, 2 tires, welded ⅞" shell, complete with drive and motor
1—Louisville rotary steam tube dryer, 8' x 45'
1—Rotary dryer 7' x 60', 2 tires, ½" shell, complete with drive, motor, blowers and all auxiliary equipment
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1—Rotary dryer 6' x 56', 2 tires, ½" shell, complete with drive, motor, blowers and all auxiliary equipment
1—Rotary dryer 6' x 50', 2 tires, ½" shell, complete with drive, motor, blowers and all auxiliary equipment
1—Rotary dryer 6' x 35', 2 tires, ½" shell, complete with drive, motor, blowers and all auxiliary equipment
1—Rotary dryer 4' x 20', 2 tires, ½" shell, complete with drive, motor, blowers and all auxiliary equipment
10—Pacific vertical feed water reciprocating pumps, 10 GPM to 340 GPM, 80' head to 175' head, complete with motors
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1—Mosser 4'x47'x5/16" Rotary Dryer
1—Traylor 8'x11' Steel Lined Ball Mall
2—Beth. Fdy. 7'x24' Compeb Mills
3—Allis-Chalmers 6K; 8K Gyratorys
1—Non-Clog 36"x50" Hammermill
1—Barber Greene Model 82A Loader

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3'x6' Horiz., 4'x9'x12" Vert. Puggers
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6'x25'; 6'x50' Louisville Rotary Dryers
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Dixie #5060 Mogul Hammermill 500 HP Motor
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2—Raymond 4 Roll High Side Mills
Raymond 3 Roll #3036 Hi-Side Mill
Raymond #50, #40 Impact Mills
6—Tyler Hummer Screens 4'x8', 4'x6'
4—Robinson Saw Tooth Crushers
535'—24" Troughing Belt Conveyor
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1—10' dia. Raymond Single Whizzer Separator with 100 H.P. motor.
1—Link Belt 6' x 14' double deck Vibrating Screen.
1—Tyler Hummer Screen 4' x 10'.

CONVEYORS

1—Fuller-Kinyon Conveying System, type H257, 100 H.P.
2—Fuller-Kinyon Conveying Systems, type 10-B-No. R, 75 H.P.

WIRE PHONE WRITE

BRILL EQUIPMENT COMPANY
35-59 Jabez Street
Newark 5, N. J.
Tel.: Market 3-7420

FOR SALE

Telsmith Jaw Crusher 25" x 36"
Telsmith 13-B Crusher
Telsmith Super Scrubber
Syntron Grizzley Feeder F-86
10" Peerless Turbine Pump, 150 h.p., 2000 GPM

ASSOCIATED SAND & GRAVEL CO.
6300 Glenwood Ave., Everett, Wash. - Alpine 2-2111

TITANIUM PLANT

1—Traylor 11' x 155' Rotary Kiln, 2 tires, welded, 7/8" shell.
1—Rennenberg 6' x 60' Rotary Kiln.
2—Abbe 5' x 16' Ball Mills.
3—Bucket Elevators; 125', 32', 30'.
2—Aurora 24" Vert. Cent. Pumps, 200 HP motors, 5000 gpm, 125' head.
1—Bemis Automatic Bag Packer, Sewing Machine, Conveyor and Flattener.
1—Deep Well Pump, 75 HP Vert. Motor.
1—8' x 8' Oliver Precoat Filter.
6—Dorr Thickener Mechanisms, 18'.
18—Steel Buildings 20' to 80' wide, x 60' to 140' long.
2—20 ton Overhead Cranes, 30' & 35' spans.
8—Redler Conveyors; 30', 35', 40', 75', 80' and 125' long.
200'—Screw Conveyor, 9" and 12".

SEND FOR CIRCULAR

Representative on Premises

Broening Highway Baltimore, Md.
Tel: Medford 3-2911

BRILL EQUIPMENT COMPANY
35-59 Jabez Street
Newark 5, N. J. Market 3-7420

LIQUIDATION

CEMENT PLANT, AKRON, N. Y.

Priced For Quick Sale

2—Allis Chalmers 8' x 100' Rotary Kilns.
1—Raymond 36" Bowl Mill, 50 HP.
1—Vulcan 6' x 50' Dryer, 25 HP.
1—Clyde #3 Hydrator with motor.
1—Raymond 16' Double Whizzer Separator, 75 HP.
14—Bucket Elevators, chain mounted, steel casing, 25' to 56' c.c.
1200'—9" and 14" Screw Conveyor.
15—Bins from 6' x 7'6" x 12', to 17' x 20' x 12'.
1—Steel Building, 60' x 80' x 40' high.

Call John Marshall at Akron. Tel.: LH 2-5421

BRILL EQUIPMENT COMPANY
35-59 Jabez Street Newark 5, N. J.
Market 3-7420

FOR SALE

D 13,000 Power Units, Serial Nos. IN-1089; 4S-1869 SP; 4S-1879 SP.

WEST LAKE QUARRY & MATERIAL CO., INC.
BOX 497 - TAUSSIG AVENUE
BRIDGETON, MISSOURI

FOR SALE — REASONABLE

Thew L-26 3¼ Yd. Shovel
S/N 26401 — 4 yrs. old
GMC Diesel Engine

THE CLEVELAND QUARRIES COMPANY
Amherst, Ohio

FOR SALE

One Sly Dust Collector No. 170, Double File, Four Compartment, Type 360, with dust house, net cloth filtering area of 22,440 square feet for 40,920 CFM, damper assembly for automatic continuous operation, shaking mechanism complete with shaker motors, damper valves and mechanism. Good operating condition. Price Bargain F.O.B. Gouverneur, N. Y.

For information contact Gouverneur Talc Co., Inc., Gouverneur, N. Y.

MOTORS • GENERATORS
TRANSFORMERS
NEW • REBUILT
ELECTRIC EQUIPMENT CO.
WORLD'S LARGEST INVENTORY
CALL COLLECT GL 3-6783
P. O. BOX 51 • ROCHESTER 1, N. Y.

BEST SELECTIONS

ROTARY KILNS - DRYERS - COOLERS

1—Traylor 11' x 155' Rotary Kiln, 7/8" shell.
1—Allis Ch. 9' x 130' Rotary Kiln, 3/4" shell.
2—Allis Ch. 7'6" x 7' x 125' Rotary Kilns.
1—Traylor 8' x 80', 5/8" shell.
1—Vulcan 8' x 80', 1/2" shell.
1—Vulcan 7' x 80', 1/2" shell.
2—Link Belt Roto Louvre Dryers, 6'4" x 24'.
1—Rennenberg 6' x 50', 3/8" shell.
1—Ruggles Cole 5' x 30', 3/8" shell.
1—Allis Chalmers, 4' x 40'.
1—Allis Chalmers 4' x 30', 3/8" shell.
1—34" x 30', 5/16" shell.

WIRE PHONE WRITE

BRILL EQUIPMENT COMPANY
35-59 Jabez Street Newark 5, N. J.
Tel.: Market 3-7420

AUCTION

SAND and GRAVEL EQUIPMENT

TIME: Saturday, May 21, 11 A.M.

LOCATION: Seven miles south of Norwalk, Ohio on Ridge Road. **Phone:** North Fairfield 2250 or 2578.

NOTICE: Our gravel deposit having been depleted, we are selling at public auction, our complete line of crushing, screening, washing and loading equipment. The following equipment is all owned by Orlin R. Gilbert DBA Huron Sand & Gravel Company. The general condition is very good, all pieces ready to go to work.

CRUSHING EQUIPMENT:

1 AAA 20x36 Cedar Rapids Portable Primary Crushing Unit, GMC Diesel Power, Hopper with 5x8 Webb feeder 30"x 27' delivery belt, mounted on tandem rubber.
2 9x30 Good Roads Jaw Crushers, one mounted as a unit with a 3x6 single deck Plate Diester Vibrator screen; the other with a 2½x6 Bonded single deck Vibrator. Units mounted on steel skids.
1 Jeffrey Swing Hammer Pulverizer, 24x18, with spare parts.

SCREENING EQUIPMENT:

1 Pioneer 4x10 3 deck vibrator screen.
1 Plate Diester 3x6 single deck vibrator screen.
1 Bonded 30x4 2 deck vibrator screen.
Quantity of new screen cloth for above vibrators.

WASHING EQUIPMENT:

1 Eagle Iron Works 22x15 single screw gravel washer with drives.
1 Eagle Iron Works 20x18 single screw sand classifier with drives.
1 Myers Centrifugal water pump Model 30LM-20 connected direct to a 20 hp. GE 3600 RPM 220-440 approx cap 350.
1 Myers Centrifugal water pump Model 25HM-5 connected direct to a 5 hp. 1750 RPM 220-440 approx cap 150 gal per min.
1 5x6 Centrifugal water pump, belt drive.
1 8" Morris Centrifugal water pump.
1 4x6 Sand pump, Kansas City Hay Press.
1 15' pc. 8" suction hose with foot valve.
1 12' pc. 6" suction hose with foot valve.

ELECTRICAL EQUIPMENT:

1 100 KW Generating Unit 220-440 V Direct connected to Cummins Diesel 6 cyl Model NH6GA with automatic shut-off.
1 50 KW Generating Unit 220 V Direct connected to 6 cyl Buda Model M766 Gasoline power.
1 Capacitor for power factor improvement Type DL422 230 V 3 phase.
(1) 40 hp., (2) 25 hp., 1200 RUM motors.
(1) 15 hp., (2) 10 hp., (2) 7½ hp., (3) 2 hp. 1750 RPM motors.
Above motors are 220-440 3 phase and most of them totally enclosed.
(1) 7½ hp., (3) 5 hp., (1) 3 hp., (3) 2 hp. Master Gear Head Motors. Power shaft 155 RPM 220-440 3 phase and totally enclosed. Were used on conveyors.
Misc. switches and starters and wire for electrical equipment.

LOADING & HAULING EQUIPMENT:

1 175A 2¼ yd Michigan Diesel Power, rubber tired loader.
1 L-41 Lorain Shovel with Cat 318 power.
1 #25 Bay City Shovel ½ yd with gas power.
1 Haas Crawler mounted bucket loader.
1 International R190 Tandem with 10 yd dump.
2 Koehring Semi-trail Dumps with gasoline tractors, approx 10 yd.
1 1¼ yd Bay City Drag Line Bucket.
2 Daybrooke 4 yd dump bodies.
A quantity of conveyors, an all steel tipple and misc. items too numerous to mention.
1 M&M Power unit Model 165-4A Gas.
1 steam Jenny.

HURON SAND & GRAVEL CO.

Route 3 Willard, Ohio

FOR SALE

2 Loomis Well Drills—Electric
2 Loomis Well Drills—Gasoline
1 Armstrong Bit Sharpener, Mdl. #6
1 Telsmith Settling Tank, #5
1 Telsmith Settling Tank, #6
1 Telsmith Settling Tank, #7
1 Western Side Dump Car, 16 Yd., Std. Ga.
1 Orton Steam Crane, 25 Ton, 2½ Yd.
1 Vulcan Steam Locomotive—38 Ton
1 Vulcan Steam Locomotive—40 Ton
1 Baldwin Steam Locomotive, 50 Ton & Parts
1 Buffalo Exhaust Fan, #24
1 Buffalo Exhaust Fan, #30
1 Gates Gyratory Crusher, #7½K
1 McLanahan Crusher, 30" x 42" style C627
1 Link Belt HD Picking Table, 4' x 20'
1 Wisconsin Air Cooled Gas Engine, Mdl. VP-4
1 Flinck's Lime Spreader, 7 Ft.
1 Hoist Chain, Hand Forged, 1⅛" x 135'

NEW PARTS FOR 36" McCULLY CRUSHER

1 Main Shaft and Mantle Assembly
1 Split Adjusting Nut
1 Steel Baffle Ring
1 Cast Iron Main Shaft Sleeve

ELECTRIC MOTORS

2 5 HP, Allis-Chalmers, SR, 3/60/440/600
2 30 HP, AC, SR, TEFC, 3/60/440/1200
1 50 HP, Economy Westinghouse, 3/60/440/900
1 150 HP, AC, SC, 3/60/440/1200
1 100 HP, Burk, 3/25/440/1500
1 9 HP, G.E., Direct Current, 230V, 900 RPM

MOTOR-GENERATOR SET

1 1000 Amp, 250V, Allis-Chalmers Generator Direct Connected to 300 HP AC Synchronous Motor 3/60/440/600

THE FRANCE STONE COMPANY

1800 Toledo Trust Bldg., Toledo 4, Ohio
Cherry 1-4101

FOR SALE

54 x 24 Roll Crusher, Model 1953, Serial No. 54175, good condition.

WEST LAKE QUARRY & MATERIAL CO., INC.
BOX 497, TAUSSIG AVENUE, BRIDGETON, MO.

WANTED TO BUY

ROTARY DRYERS, KILNS, COOLERS, ROD MILLS, BALL MILLS, TUBE MILLS, CONE, GYRATORY, JAW & ROLL CRUSHERS, LOCOMOTIVES, DERRICKS, AIR COMPRESSORS.

THE DARIEN CORP.
60 E. 42nd St. N. Y. 17, N. Y. MU 2-0042

POWER EQUIPMENT CO.
Offers
BARGAIN PRICES
ON GUARANTEED NEW and Rebuilt MOTORS!

MAY SPECIALS

GUARANTEED REBUILT MOTORS
220/440 V. 60 Cycle—3 Phase

HP	Make	Type	Speed
350	West. B.B. Drip	CS-2255GH	1200
250	El. Dyn. T.E.F.C.B.B.	KNX	1880
200	G.E. B.B. Open	K-6335	900
150	L.A.B.B. Splash	FX-1365	900
150	A.C.T.E.F.C.	AZ-3-88	900
125	Reliance B.B. Open	AA-504	3600
100	West T.E.F.C.B.B. XP	CS-770	1200
100	Rel. T.E.F.C.B.B. XP	23E8	900

Send for our FREE Catalog. Cash for your surplus.

Large line of motors, control equipment, AC & DC Generators, MG sets and transformers.

Phone or Wire Us Collect

POWER EQUIPMENT CO.
8 Cairn St., Rochester 2, N. Y.
Phone BEverly 5-1662

MOTORS AND GENERATORS

All sizes, new and rebuilt. Starters, accessories, pulleys and repair parts. Gear motors, Falk Shaft mounted Speed Reducers, couplings and V-belt drives.

EXPERT REPAIR SERVICE
NUSSBAUM ELECTRIC CO.
220 E. Douglas Avenue — Fort Wayne, Ind.

BEST BELT BUYS

Heavy duty, 2500-3000# cover tensile, 16-19# friction pull. Brand new, factory fresh.

		LIST	SELL
14" 4 ply 28 oz.	1/8"x1/32"	$4.48	$2.60
16"	1/8"x1/32"	$5.06	$2.93
18"	1/8"x1/32"	$5.61	$3.26
18"	1/8"x1/16"	$5.92	$3.44
20"	1/8"x1/32"	$6.14	$3.56
24"	1/8"x1/32"	$7.22	$4.18
24" 5 ply 28 oz.	1/8"x1/16"	$8.78	$5.09
30" 5 ply 28 oz.	1/8"x1/16"	$10.19	$6.31

Many other sizes. Samples on request. Distributor inquiries invited.

PALTECH CO.
New Canaan, Conn. — WO 6-4126

Wanted—A good used 3 or 3½ ft. short-head Cone Crusher for reducing 1¼" size Quartzite to Silica Sand. Union Mining Co., 2306 First Natl. Bank Bldg., Pgh. 22, Pa.

FOR SALE — EXCELLENT CONDITION

1—Used Sterns Zipper Block machine with off-bearer
1—4" mold box complete with packer-head assembly
1—6" mold box complete with packer-head assembly
1—8" mold box complete with packer-head assembly
1—12" mold box complete with packer-head assembly
7000 Cast Iron pellets
40 Steel Racks

PRICED TO SELL
Wolverine Lumber & Supply Company
98 Winchester St. Monroe, Michigan
Phone - CHerry 1-1226

DUST COLLECTORS

2—Foundation Dust Collectors Model 4A, New York State approved. Air motor drive, carriage mounted on four pneumatic tires. New 1958, used very little. Available immediately.

L. B. SMITH, INC.
357 W. Fayette St. Syracuse, N. Y.
Phone: GR 5-2196

3—10' x 78' Dryers—2', 3', 4', 5½ Symons and Telsmith Cone Crushers—3648, 4042, 4872 Jaw Crushers and smaller sizes—Jeffrey 2448 DTF Vibrating Feeders—other types of Feeders—Eagle Fine & Coarse Material Washers—Dixie Non-Clog moving plate Hammermills—Asphalt Plants Jaw—Cone—Gyratory—Ball Double and Triple—Hammermill and Impact Crushers—Ball—Rod—Tube Mills—Screening, Washing and Crushing Plants, Classifiers, Compressors, Conveyors, Cranes, Drills, Dump Cars, Dredges, Feeders, Hoists, Motors, Generators, Kilns, Dryers, Locomotives, Pumps, Screens, Shovels, Draglines, Transformers, Euclid Trucks.

STANLEY B. TROYER EQUIPMENT CO.
Box 97 Phone 500 Crosby, Minnesota

For Sale

Thew-Lorain Shovel, Model L-40E, Serial No. 11577, Crawler mounted D-4600 Cat Engine (Diesel), ⅝ yd. Ansco Dipper 13' - 4" Dipper Stick, 16' Boom, 2,631 running time. Large spare parts inventory. Link-Belt Speeder, Self-propelled crane, ½ yard, Model UC-55, Hydraulic Steering, Brakes and Clutch, 351 HP Gasoline Buda Engine, 30' Boom. Spare parts.

CABOT CARBON COMPANY
CABOT MINERALS DIVISION
Willsboro, New York
Telephone: WO 3-4262

ELECTRICAL FOREMAN—MAINTENANCE FOREMAN

Experienced electrical foreman and maintenance foreman needed for one-year-old cement plant located in Foreman, Arkansas. Plant is one of the most modern in the country.

Excellent fringe benefits. Interested parties send confidential resume including age, experience, and salary requirement to:

ARKANSAS CEMENT CORPORATION
Box 398 FOREMAN, ARKANSAS

FOR SALE OR RENT

2½ Yd. Link-Belt Crane-Dragline. K-595. 140' Boom & Jib. Caterpillar D-17000 Engine.
1 Yd. Lorain L-50. 60' Bm. GM Diesel. New 1951.
40/50 Ton American Diesel Loco. Crane.
25 Ton Brownhoist Diesel Loco. Crane.
45 Ton Gen. Elec. Diesel Elec. Locos.
25 Ton Gen. Elec. Diesel Elec. Loco.
75 Ton Whitcomb Diesel Elec. Loco. 500 HP Cat. New 1951.

WHISLER EQUIPMENT CO.
1905 Railway Exchange Bldg., St. Louis 1, Mo.
CHestnut 1-4474

FOR SALE

SHOVEL — MARION #331
DIESEL ¾ yard Bucket
Price $5,000

This shovel was purchased new in 1946 and has been used to dig clay. In 1958, repairs to the Caterpillar diesel engine were made at a cost of $2,000.00, and $1,500.00 was spent on the shipper shaft. The shovel is in good working order and can be seen at the address below. A demonstration can be arranged at your convenience.

For further information telephone or write:

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Cicero Ave. and 39th St. Cicero 50, Ill.
Phones Bishop 2-1586 or OLympic 2-0157

FOR SALE
LOCOMOTIVES

2—45 ton G.E. Diesel Electric with Cummins Engines
1—65 ton Porter Diesel Electric with Cummins Engines
1—30 ton Plymouth diesel mechanical with GMC Engine.

Excellent Condition

Phone—Wire—Write

HYMAN-MICHAELS COMPANY
108 N. State Street Chicago 2, Ill.
'Phone: DEarborn 2-5422

FOR SALE

Three 2' - 4" T.Y. Traylor Gyratory Crushers and one 4' T.Y. Traylor Gyratory Crusher.

Prices on request

C. W. BLAKESLEE & SONS, Inc.

P.O. Box 1809 **New Haven, Connecticut**

Telephone UN 5-4135

KOEHRING DUMPTORS

3—Model WD-60 Dumptors, 6 cu. yd. GM Diesel engines. Good tires. $12,000.00 LOT PRICE F.O.B. ELIZABETHTOWN, KENTUCKY.

Write - Wire or Phone Jim Waddell

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MElrose 7-4741

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(Rock Bits)

TUNGSTEN CARBIDE

All sizes, "F", "H", "D", "200", "400", "600" thread. Not war surplus. Less than distributors' prices. Write for list.

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Hose—Suction and Discharge. New. 1 inch to 6 inch.

Airport Landing Mat—Ex. cond.
Ingersoll Rand Compressor, 210 CFM.
Buda 4-cylinder Power Unit.
Ingersoll-Rand Wagon Drills.
Plywood Chests H.D. 63"x13"x12".
Alcoa Aluminum Pipe—Rent or Sale.

OLDFIELD EQUIPMENT CO.

430 W. Seymour VA 1-5582

CINCINNATI 16, OHIO

SPECIALS: Heavy media Wemco #2M MILL, drum separator, classifier, screen, magnetic separator complete. 180' span Steel Bridge Truss, 46'x24' Steel Bridge. Steel Bldg. 36x90'; TANKS.
PLANTS: CR Commander 1036, 1524, 1824, 2236, Univ. 880 Port. Noble CA354, CA506 Batch. Cummer 3000# & 4000#, BG842 Asphalt.
CRUSHERS: 816, 1020, 136, 1536, 1836, 2036, 2436, 3642, 4042 JAW. 9K & 12K Gates. AC 322R, 636, 848R. 25½ & 37½ Kennedy. 28", 25R Telsmith GYR. 3' std. & 8'/H Symons. 1836, 1842 sgl. roll 3018, 4024, 5424 DBL ROLL.
DRYERS: 2x12, 3x15, 4x20, 4x30, 5x24, 6x25.
COMPRESSORS: 750 CFM West. 600 CFM IR.
FEEDERS. 3x8, 3x10, 3x14 Apron. LOADERS. 30" McLanahan. 30"x20' Eagle dbl LOG WASHERS.
MILLS: Raymond 5047, 5057 Roll. Dixie 3630, 3650 Williams #30, #40 Hammer.
CONVEYORS: 18x30, 18x178, 24x115, 36x250.
SHOVELS: Marion 93M, 111M. BW6, 80D. Link Belt LS50 LS90, B5. Lima 34, 604, 1201. P&H 655B, 1055. Kochring 605, 1005. Lorain 90, 820.

MID-CONTINENT EQUIPMENT CO., INC.

8321 Gannon Wydown 1-2826 St. Louis 32, Mo.

SPECIAL!

2—American heavy duty, hand type friction drag-scraper hoists, Cap. rear drum 5000# @ 600 RPM. Front drum 12,000#. Inhaul speed 250 FPM. Excellent condition.

SPECIAL PRICE (no motor) — $3,750.00
With 125 HP Elec. Motor — $6,500.00

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EQUIPMENT CORPORATION OF AMERICA

Box 608P, Clifton Heights, Pa.
Box 43P, Coraopolis, Pa. (suburb of Pittsburgh)
30P Church St., New York 7, N.Y.

YOU CAN BUY Government Surplus ANYONE IS ELIGIBLE

"10 billion to be sold" is the estimate for '59-'60. Weekly letter tells what is being sold, when, where and who to contact.

$7 for 3 mo. $25 per yr.

GOVERNMENT SURPLUS SALES

P. O. Box 6602PQ
Washington 9, D. C.

DEPENDABLE USED MACHINES

SPECIAL: Shovel front for Lorain 77B 1½ yd. with PM shovel bucket

Hopto Scrap Grapple	4T Const. trench ditcher	Bay City 25 gasoline dragline
Mod. J Quickway backhoe	P&H #150 ½ yd. dragline	Lorain 20 ton truck crane
Unit #514 ½ yd. backhoe	360 Hopto GMC tandem truck	L Insley ⅜ yd. clam & drag
Unit #614 ½ yd. backhoe	Lima 34 Paymaster backhoe	Tetratrac 500 w/hoe & trailer
4x10 Telsmith d.d. screen	Amer. 375 ⅜ yd. dragline	Amer. 50B 3-drum hoist w/slewer

This equipment rebuilt in our modern plant by expert mechanics. Come see it!

10004 Southwest Highway TRACTOR & EQUIPMENT CO. Oak Lawn, Illinois

ELECTRICAL POWER EQUIPMENT

REBUILT SLIP RING MOTORS

3 ph. 60 cy. 220 or 440 volts (*2200 volts or higher)

HP	RPM	MAKE	TYPE
1500	514*	Al.-Ch.	Mill Type
1300	360*	Al.-Ch.	Mill Type
900	160*	Al.-Ch.	Mill Type
600	1800*	Gen. Elec.	M-6345B, Dppf. New
500	1200	Gen. Elec.	M-6345Z, Dppf.
400	720	Gen. Elec.	MT-57 3Y
350	900*	West.	CW
350	1800*	Al.-Ch.	ARYW (2)
300	1800	Cr.-Wh.	SR
300	600	Gen. Elec.	I-M-17A
300	600*	F.-Morse	HV-H300D, BB
300	450	Gen. Elec.	I-M, 2 or 3 brg.
250	720*	Gen. Elec.	I-M, 17A

SQUIRREL CAGE MOTORS

3 ph. 60 cy. 220 or 440 volts (*2200 volts or higher)

HP	RPM	MAKE	TYPE
1250	3600*	Al.-Ch.	ANX
800	1800	West.	CS-34C
600	600*	West.	CS-44-C15 Dppf. (2)
500	1200	Gen. Elec.	I.K.
400	1800*	L. Allis.	BB. Sppf.
400	1800	West.	BB. Dppf.
400	1200	Gen. Elec.	K TP-565
350	3600	Cr.-Wh.	SC. Dppf.
300	1200	Gen. Elec.	KT-559. Dppf.
300	600*	West.	CS-39A
300	600*	West.	CS-1002
300	400	Elliott	Design 40Y03
250	1800	Gen. Elec.	KT-559
250	1800	West.	CS-8120S, TEFC. Xpf.

SYNCHRONOUS

3 ph 60 cy A.C.

HP	RPM	MAKE	REMARKS	VOLTS
900	1200	Gen. Elec.	TS. 1.0 PF	2300
300	357	Ideal	SMM, .8 PF	4000/2300
275	450	Gen. Elec.	ATI, 1.0 PF	2300
250	1200	Al.-Ch.	1.0 PF	440(4)
225	300	Gen. Elec.	TS-6244D, 1.0 PF	220
225	360	Elec. Machy.	1.0 PF	440
225	720	Al.-Ch.	.6 PF	2200/440
210	1200	Gen. Elec.	ATB-32, bus. exc.	400
200	1800	Gen. Elec.	TS-7559, dir. con. exc.	440
190	720	Elec. Machy.	1.0 PF	440
150	300	West.	HR. 1.0 PF	2200
150	1200	Al.-Ch.	1.0 PF	440
150	1200	Elec. Machy.	.8 PF	2200/440
125	277	Gen. Elec.	TS-8214, 1.0 PF	2300(3)

M. G. SETS

KW	Make	Motor A.C.V.	Generator D.C.V.
1000	West.	4160	250
600	G.E. (3 unit)	2300/440 syn.	125/250
500	West.	2300/440 syn.	125/250
400	Al.-Ch.	2300/440 syn.	125/250
300	West.	2300/480 syn.	250
200	Reliance	2300/440 syn. TS	500
200	Gen. Elec.	2300/440 syn. TS	250/275
200	Ridgeway	2300 syn.	250
150	Al.-Ch.	220/440/220	250
150	West.	2300/440/220 syn.	125/250
125	West.	2400/480 syn.	250
125	G.E.	2400/480 syn.	250
100	West.	2300/4000 syn.	250/275
100	G.E.	2300/4160 syn.	250

D. C. MOTORS

37½/75 575/1150 Reliance CD-1342Y(450V.) 230 Volts

HP	RPM	MAKE	TYPE
300	575/1150	West.	CB-509-4
200	700	West.	SK-201
175	700	G.E.	FLC-11
150	380/1000	G.E.	MCF
150	1150	G.E.	RC-37 (4)
150	720	G.E.	RC-39A
150	400	West.	SK-201
125	870	G.E.	CD-1343.dppf.
100	2500	G.E.	RC-34
100	400/800	G.E.	MPC-6
100	575/1150	G.E.	CD-147
100	1150	West.	SK-163
100	750	G.E.	CD-135
100	575	G.E.	CD-147

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Special Offer — Like New

3—1250 KVA Allis Chalmers Class OA Oil filled Sgl ph 60 cy 34,400 Volt primary, 480 volt secondary with taps, manufactured 1955.

Write for current complete stock lists on Motors, Transformers, Generators or other electrical power equipment you need or send your list of surplus and used equipment for our offer.

Our 50th Year 1910 to 1960

Phone CAnal 6-2900

CHICAGO Electric Co.

1329 W. CERMAK ROAD • CHICAGO 8, ILL.

For Sale
EUCLIDS
Rear, Bottom and Scrapers

15W Bucyrus-Erie Dragline, 14 yd.
9W Bucyrus-Erie Dragline, 9 yd.
7W Bucyrus-Erie Dragline, 7 yd.
200W Bucyrus-Erie Dragline, 6 yd.
5W Bucyrus-Erie Dragline, 5 yd.
8½ yd. Bucyrus-Erie Shovel
950B Bucyrus-Erie H. L. Shovel
170B Bucyrus-Erie Shovel, 6½ yd.
120B Bucyrus-Erie Shovel, 5 yd.
120B Bucyrus-Erie Dragline 4 yd.
88B Bucyrus-Erie Shovel and a Drag.
54B Bucyrus-Erie Shovel and Drag.
2½ yd. Northwest Shovel and a Drag
95 Northwest Dragline, 2½ yd.
1½ yd. Marion Shovel.
111M Marion Dragline, 4 yd.
111M Marion Shovel, 4 yd.
4121 Marion Shovel, 4 yd.
4161 Marion Shovel and Drag., 5 yd.
151M Marion Shovel, 6½ yd.
151M Marion Dragline, 5 yd.
7400 Marion Dragline, 10 yd.
5480 Marion H. L. Shovel, 18 yd.
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3 yd. Lima Dragline
4 yd. Lima Shovel and Drag.
2400 Lima Drag, 5 yd.
2½ yd. Manitowoc Dragline
5 yd. Manitowoc Shovel
5 yd. Manitowoc Dragline
3000 Manitowoc Crane
3900 Manitowoc Crane
2½ yd. P&H Shovel
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McCarthy & Compton Coal Auger Drills
DOZERS—LOADERS—TRUCK CRANES
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Schield Bantam	M49	Hoe, Drag, Lift on GMC 6 x 6, outriggers.
Haiss	75W	Bucket Loader, on rubber, perfect.
I-H	TD14	Crawler, 2 yd. hyd. Loader.

EIGHMY EQUIPMENT COMPANY
Pierpont at W. State St. WO 4-6706
ROCKFORD, ILLINOIS

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Gyratory—24" Allis Chalmers 8-K, with spare shaft and mandrel.

Rolls—36" diameter x 16" face Superior roll crushers (2) with separate motor on each roll.

Rolls—30" diameter x 16" face Traylor roll crusher.

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VICTOR EQUIPMENT COMPANY *Alloy Rod & Metal Division* H-65

13808 E. Imperial Highway, Norwalk, California . . . . Wakita, Oklahoma

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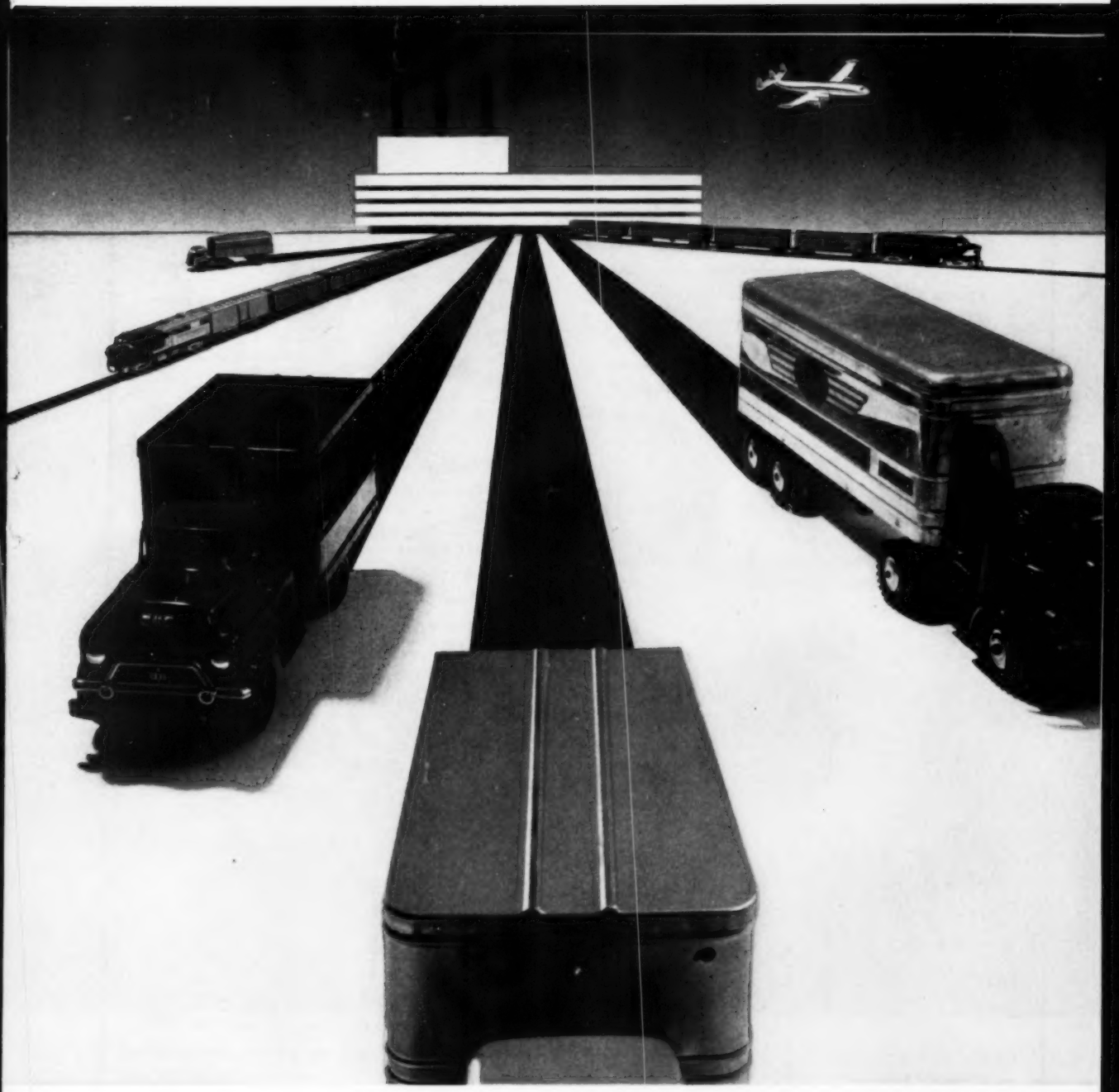

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New facilities installed at Kansas City, Houston and Toledo plants. *Now* you can count on St. Regis® for stepped-end bags from the largest facilities in the industry. Eight plants located in key areas from coast to coast give you a stepped-end bag production and delivery service designed to meet any packing schedules.

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Bethlehem Hoist Ropes Provide Muscle for World's Largest Shovel. This 65-cu-yd shovel, as tall as a 15-story building, scoops enormous quantities of overburden at the Lynnville, Indiana, mine of Peabody Coal Company. With its 170 ft boom, and six 187-hp swing motors, it has a maximum cutting height of 146 ft, and a maximum dumping height of 106 ft. In other words, it can deposit overburden atop a 10-story building, the length of a football field away.

Bethlehem Formset Purple Strand is used for the shovel's huge twin lines. These ropes are 2⅝-in. in diam and 640 ft long. Purple Strand, a tough, durable wire rope, is right at home in applications of this type, where it turns in an economical performance, day after day.

Bethlehem Steel Company, Bethlehem, Pa. *Export Distributor:* Bethlehem Steel Export Corporation

Mill depots and distributors from coast to coast stock Bethlehem Wire Rope

BETHLEHEM STEEL

BETHLEHEM WIRE ROPE
BETHLEHEM STEEL

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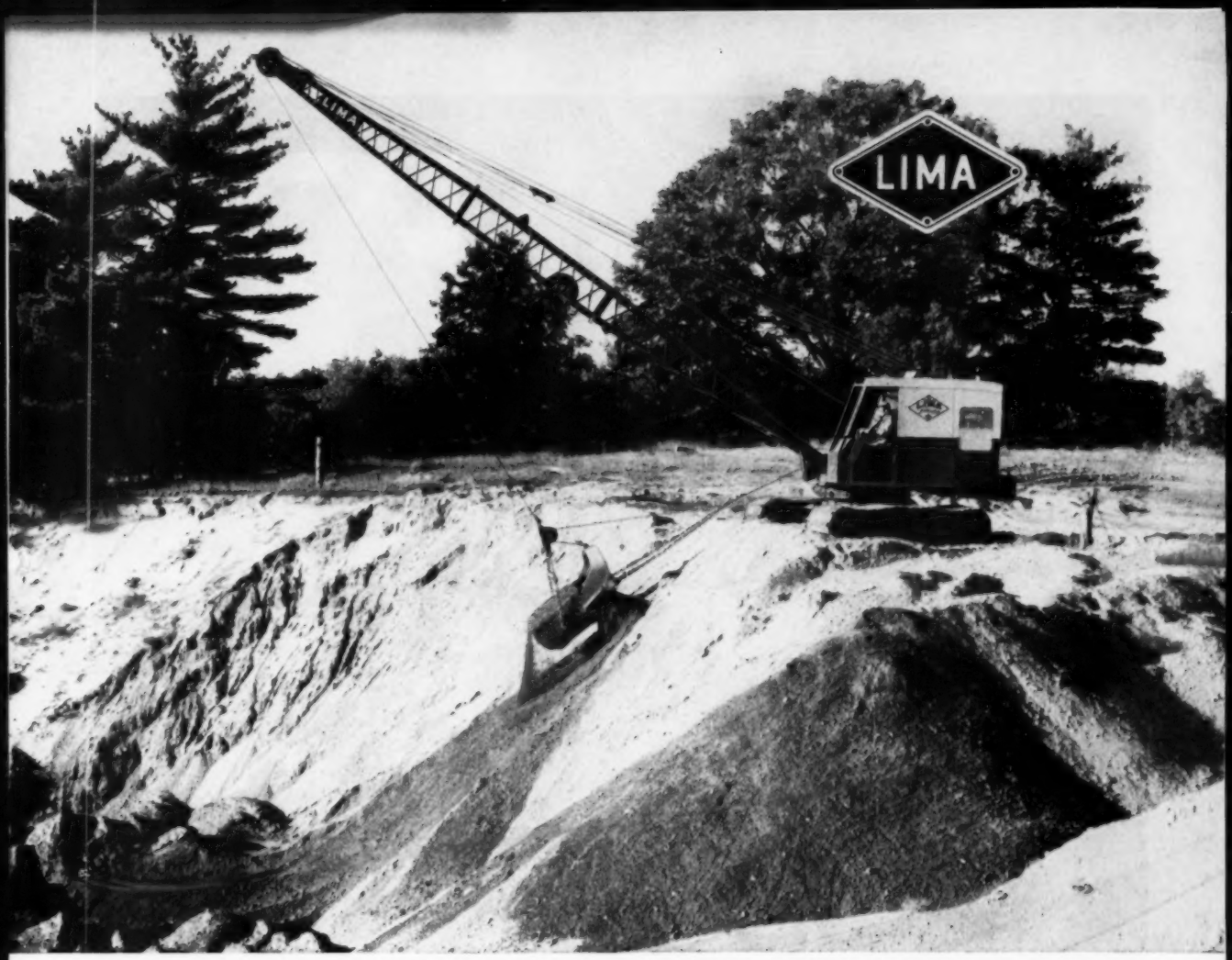

¾yd. Lima Type 24 Dragline handles fast and easily digging sand and gravel to feed crusher.

LIMA a real digging tool!

"It's tops. It's no effort for our ¾-yd. Lima Dragline to feed our crusher with its 100 yd. an hour production. Our previous dragline, not a Lima, couldn't begin to keep up with the loading demands of the crusher." That's what we hear from Hamilton Block and Tile Co., Hamilton, Mich.

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Get the facts today from your nearby Lima distributor about the type and size sure to dig or hoist more profit for you! Or write, Construction Equipment Division, Baldwin-Lima-Hamilton Corporation, Lima, Ohio.

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6029

Shovels • Cranes • Draglines • Pullshovels • Roadpackers • Crushing, Screening and Washing Equipment

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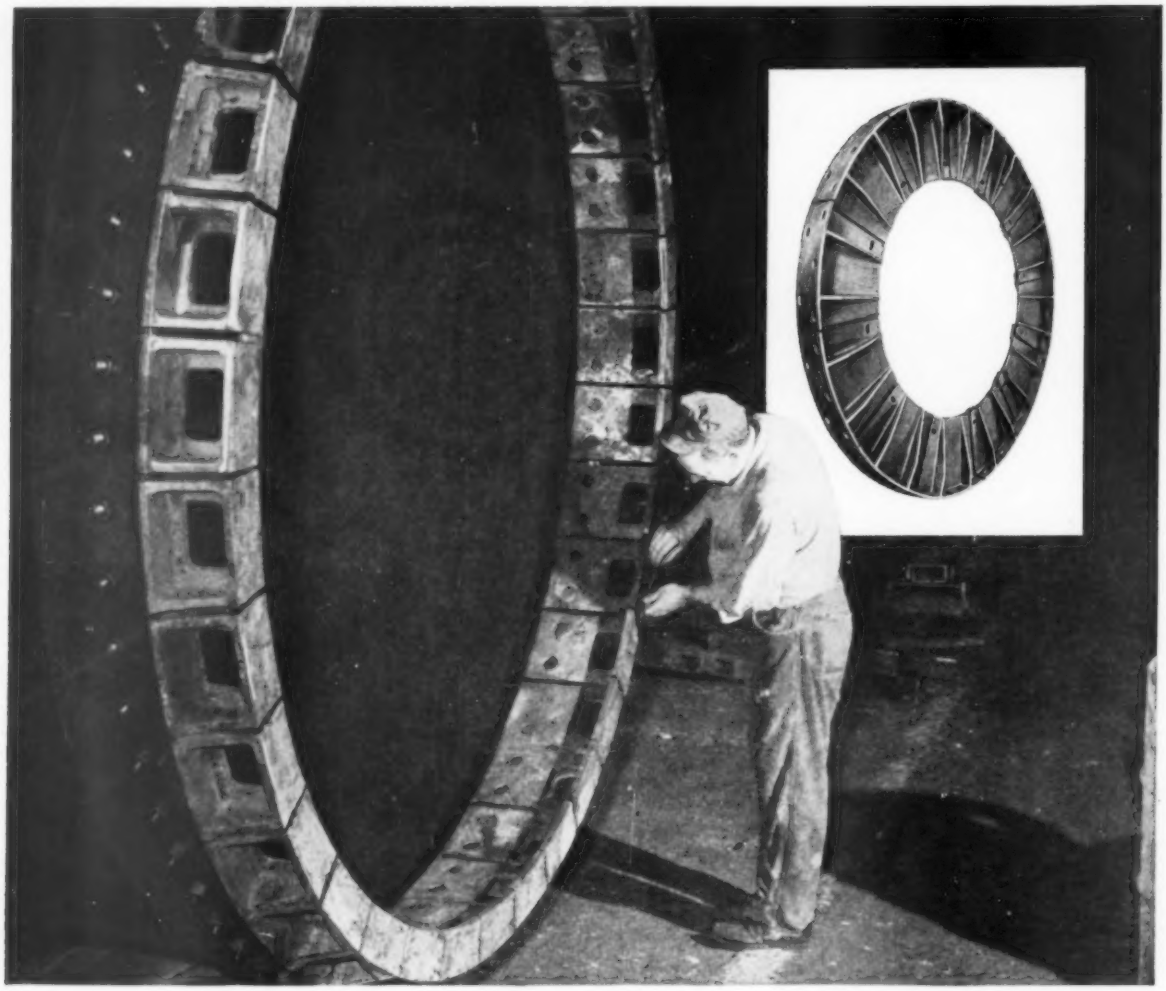

IN CEMENT, LIME, AND DOLOMITE PLANTS...

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Longer brick life and longer continuous service are being attained by 275 kilns in 54 plants using B&W Nose and Tail-Ring Castings. In many cases, the life of these castings has exceeded 9 years.

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B&W

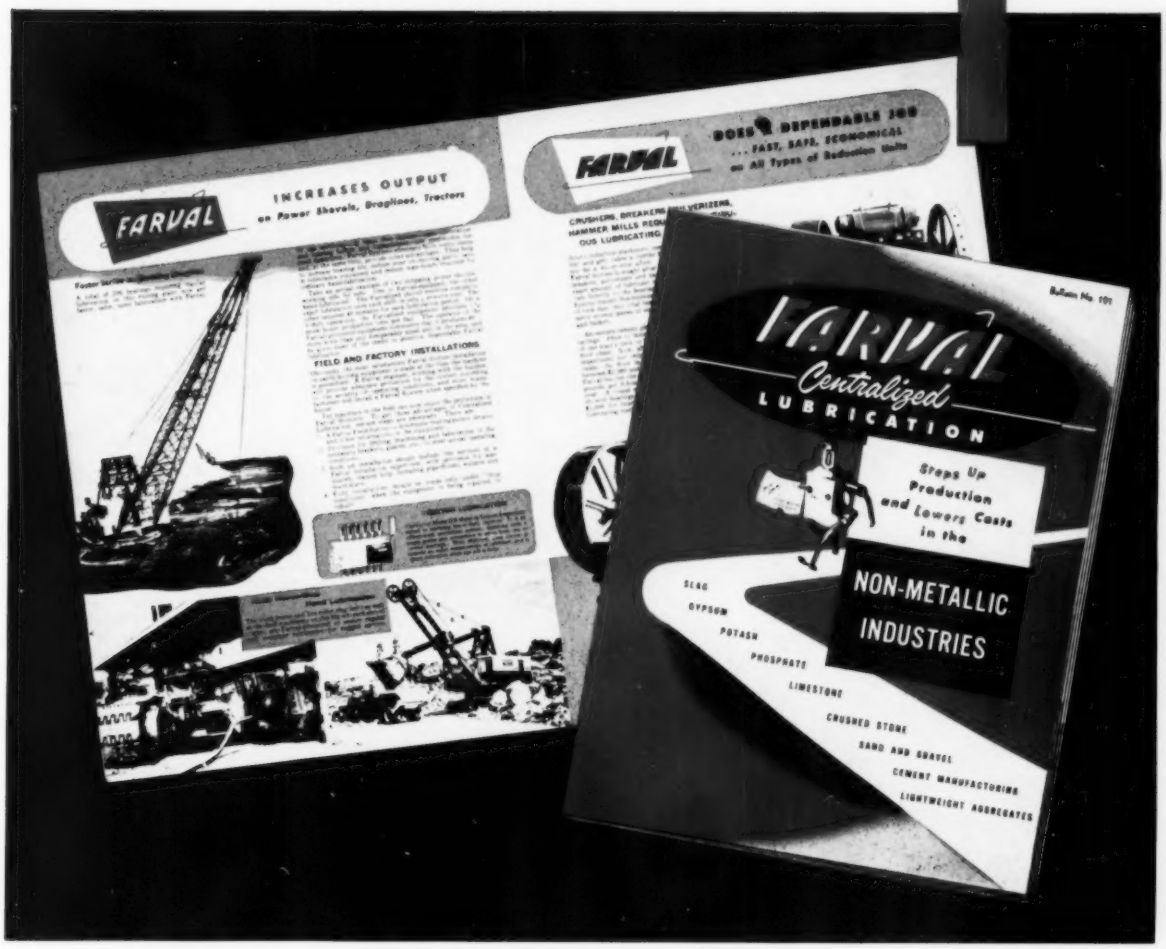
THE BABCOCK & WILCOX COMPANY

BOILER DIVISION

S-467

Here's how centralized lubrication savings soon pay for a Farval system

FARVAL—
Studies in Centralized Lubrication
No. 200



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If so, you'll want this new Farval Bulletin 101. It illustrates and describes the application of Farval Centralized Lubrication Systems to a dozen types of equipment—draglines, shovels, crushers, mills, cranes, conveyors and other machinery used in the non-metallic producing and processing industries.

Millions of industrial bearings are protected by Farval. Thousands of new systems go in each year—on equipment both new and old. Farval always pays its way. You'll want the whole story. Why not investigate? Then invest!

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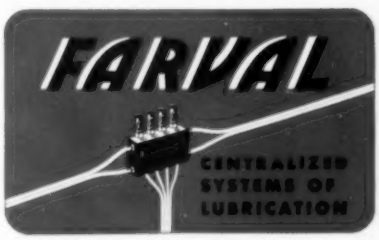
Farval Division • Eaton Manufacturing Company
3280 East 80th Street • Cleveland 4, Ohio

Proved in 30 years of service, Farval manual and automatic centralized lubrication systems protect bearings of thousands of machines in industry. Wherever you see the familiar Dualine valve manifolds, dual lubricant lines and central pumping station, you know a machine is being properly lubricated.



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"It wasn't there last year!"

This is the new 300,000 sq. ft. addition to Kraft Bag Corporation's converting plant at St. Marys, Georgia, scheduled to go "on stream" in February.

Here, in one giant integrated operation, logs from our own forest lands are turned into pulp, then into paper, and finally into heavy duty multiwall shipping sacks, using the most modern machinery and equipment the industry affords.

This expansion of our facilities is one more step in our constant efforts to provide our customers with the best in quality and service.

We invite your inquiries.

Paper Mill at St. Marys, Ga.

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Gilman Paper Company Subsidiary

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